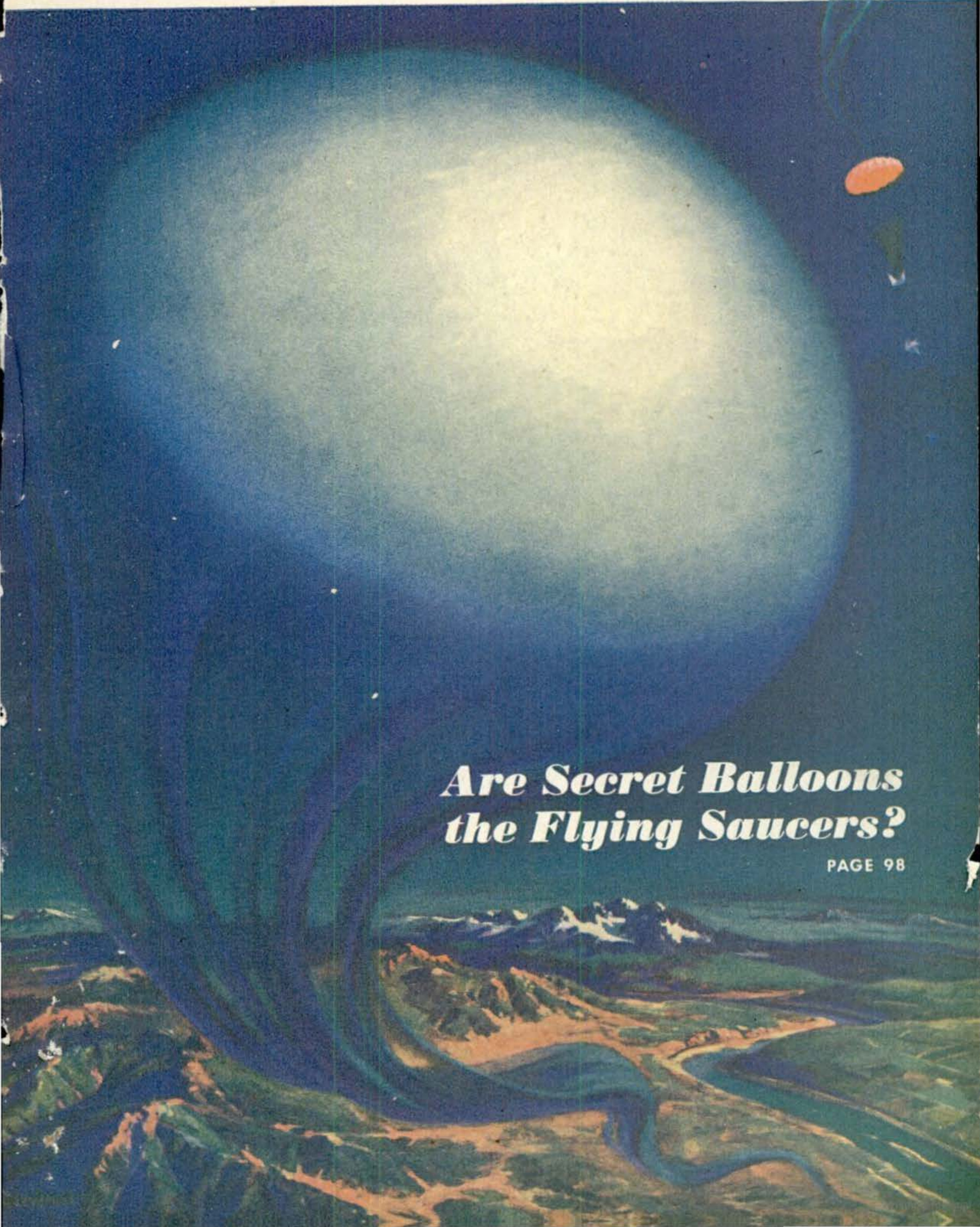
POPULAR SCIENCE

May 1948 • 25c



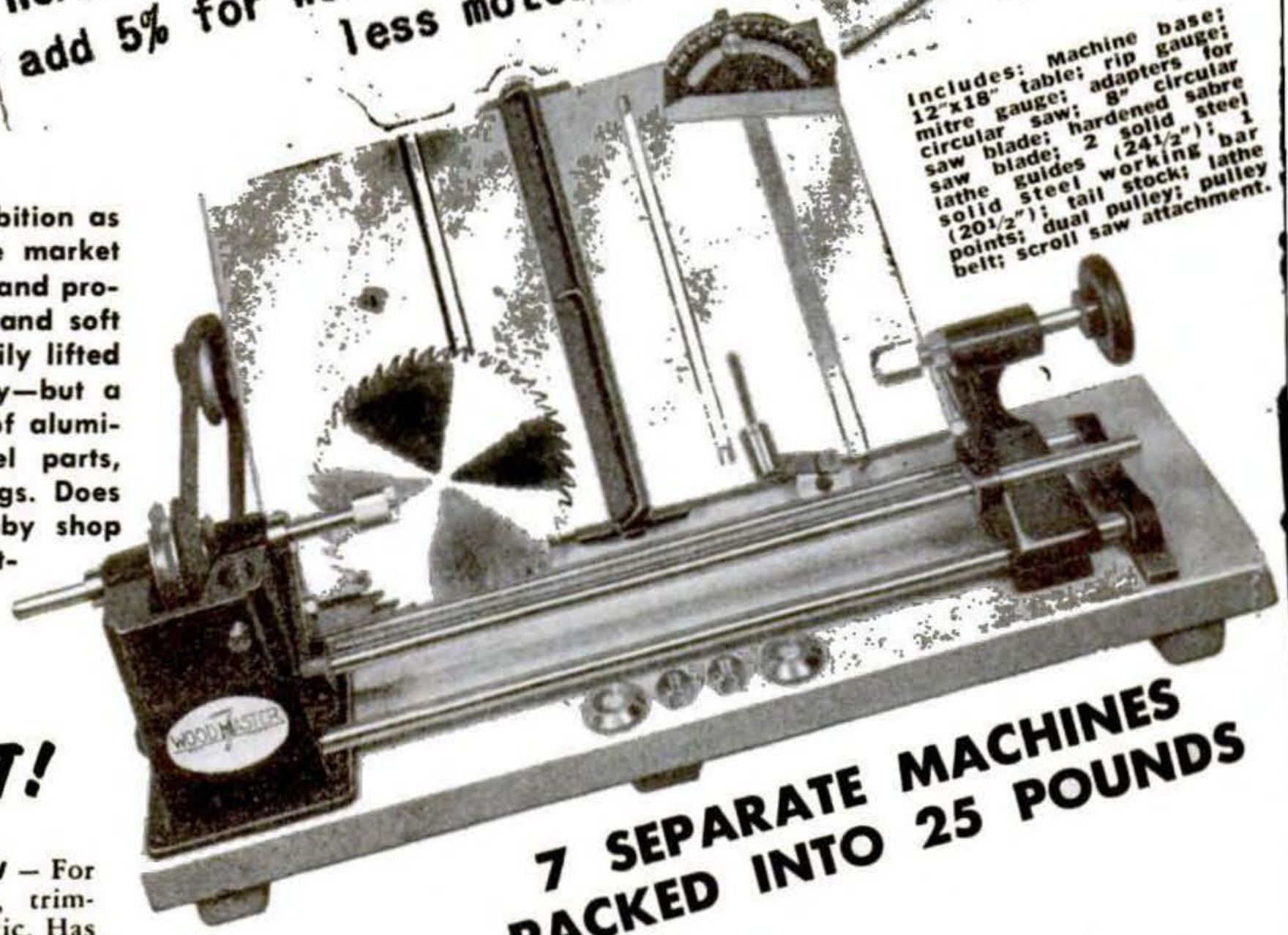
Are Secret Balloons the Flying Saucers?

PAGE 98

NOTHING LIKE IT! 7 POWER TOOLS IN 1

IT'S MAKING HISTORY! AMAZING NEW PORTABLE WOODMASTER 7 --A COMPLETE HOME WORKSHOP FOR ONLY $49.85

add 5% for west of Miss. less motor



Includes: Machine base; 12"x18" table; rip gauge; mitre gauge; adapters for circular saw; 8" circular saw blade; hardened sabre saw blade; 2 solid steel lathe guides (24½"); 1 solid steel working bar (20½"); tail stock; lathe points; dual pulley; pulley belt; scroll saw attachment.

Acclaimed at the World Hobby Exhibition as most versatile, compact unit on the market today—an instant hit with hobbyists and professional workers in wood, plastics and soft metals! Weighs only 25 pounds, easily lifted and carried by one man. Not a toy—but a rugged, durable unit superbly built of aluminum alloy with nickel plated steel parts, and bronze Oilite, self-oiling bearings. Does a man-sized job, yet makes a hobby shop practicable even in a small city apartment!

HERE IS WHAT YOU GET!

7 SEPARATE MACHINES PACKED INTO 25 POUNDS

8" CIRCULAR SAW — For ripping, mortising, trimming wood or plastic. Has 12"x18" adjustable table.

JIG SAW — Gives bandsaw results, yet allows free movement.

LATHE HORIZONTAL DRILL—Lathe will turn lengths to 16". With longer guide rods up to 30" can be turned. Can be set up as Horizontal Drill with insertion of Chuck.

BUFFER—for polishing metals and plastics.

GRINDER—for sharpening tools and for metal work.

SANDER—either sanding drum or sanding disc for finishing woodwork.

Cut working time, get better results, on any woodworking job in the shop, home, farm! Remember, this compact unit will do the job of 7 large, separate machines. Meets better than average specifications. For example: the Woodmaster circular saw will cut to a depth of 2⅛ inches, greater than the needs of the average hobbyist. Drive shaft is standard ½ inch, 20 threads per inch. Any Hardware Store can supply accessories to fit! Can be set up on workbench or kitchen table, will operate from ¼, ⅓, or ½ horse power motor, or any washing machine or refrigerator motor. Can be stored in a small closet or chest.

See the unequalled Portable WOODMASTER 7 at your dealer's today! If he can't supply you, we'll send the Woodmaster postpaid. C.O.D.'s accepted plus fee. Money cheerfully refunded if not satisfied after five day trial.

..... DEALER INQUIRIES INVITED .....

FORMERLY CLARK WOODMASTER

MAIL COUPON OR WRITE US TODAY!

WILSON-LOYDE, Dept. PS-1
23 Church Street, New Haven, Conn.

Please send me the WOODMASTER 7 The Complete Home Workshop.

☐ Remittance enclosed ☐ Enclosed is $10.00, Bal. C.O.D.
☐ Send Literature

Name.....

Address.....

.....

Dealer's name.....

Address.....

.....

THE IDEAL FATHER'S DAY GIFT!

WOODMASTER

WILSON-LOYDE
New Haven, Conn.

Copyrighted material

HOW TO DO WONDERS ON AN ACRE!

Tells About All These and More:

- **DWARF TREES** Fine Large Fruit In 2 Years!
- **2 LB. CHICKENS** Tenderest Broilers In 8 Weeks
- **40-LB. HONEY PER HIVE** Only 8 Hours of YOUR Time Needed Per Year!
- **YOUR OWN HOME** Especially Designed for Country Life
- **YOUR SMALL BARN** Cuts Chore Time to Amazingly Few Minutes
- **LOW-COST GREENHOUSE** Automatic Heat Control; Self-Waterer
- **MODERN RABBIT HUTCHES** Rabbits Are Delicious, Nutritious—Profitable, Too
- **PIGS ON CONCRETE** Gain Weight Faster—Keep Clean
- **BETTER COMPOST** Easier, Quick Way to Make It
- **TURKEYS THRIVE** New Scientific Sunporch Makes Small Flock Practical
- **GROW FISH** How To Construct a Fish Pond On Your Own Site
- **WOODLOT** Proper Management of ½ Acre Gives Permanent Fireplace Supply
- **QUICK FREEZERS** Have Changed Country Life Completely
- **BABY TRACTORS** Inexpensive Models Worth Looking Into
- **SCORES OF DIAGRAMS** To Show You How To Do Things The RIGHT Way

IT'S almost beyond belief what you can do today in spare time on a little land of your own! New prolific plants; new chemicals that control pests, kill weeds selectively, quicken growth! New specialized breeds of poultry and livestock and better ways to get results from them! Scientifically planned small barns; country homes especially designed for country living; landscaping plans that add 20% to the value of a place in 5 years! Quick freezers; new home equipment. Let me tell you how to HAVE MORE in every way on YOUR place!

Ed Robinson

I have spent five years gathering the newest and best knowledge for you, experimenting at our own little place, "trading" methods and ideas with experts and amateurs all over the world. (Perhaps you've seen the stories about our 2-acre "miniature" farm in the Saturday Evening Post, Reader's Digest, Better Homes and Gardens, etc.)

What Do You Want to Know About Country Living?

Do you want a bearing orchard *with a fruit crop in 18 months?* Do you want to raise a year's supply of tender chickens in 9 weeks—in a 3 x 4 foot space? Do you want fast-growing shade trees, growing 2½ feet instead of only 6 inches a year? Do you want to raise a pig without buying his feed? Do you want a small greenhouse anybody can afford, one that waters plants and controls heat automatically? *Do you want complete, simple details and plans for virtually every sort of practical country living "project" there is? Here is YOUR OPPORTUNITY!*

Your Year 'Round Guide

All this information, plus a goldmine of inspiration for those who want to get away from the city and really begin to live, has been packed into our "Have-More" Plan . . . which the *Magazine Digest* calls, "Utopia on Two Acres."

Here for only one dollar, within the covers of one book—in 70,000 words, 255 pictures and diagrams, 43 chapters—you will find *exactly* the guidance you need to do wonders on *your own* place.

I suppose you could read entirely through our "Have-More" Plan in little more than an evening. Yet you'll find that it becomes your year-long constant guide and source of information.

ACT NOW. Don't hesitate. If it's not all I promise and more, it costs you nothing. Send the coupon to me now—for your own sake! **Ed Robinson, P. O. Box 2805, Noroton, Conn.**

"This is the way we want to live the rest of our lives."

FIVE years ago we lived in a big apartment house in New York. I had a pretty good job. I suppose you could say that I was a "success."

But deep in our hearts, we knew we were not really *living*. We never seemed to be in good health. When the year ended, all I had left from my "success" was a great big bundle of cancelled checks.

A Better Way of Life

Today we Robinsons not only feel better and live better . . . but I know we are secure—and independent. On our 2-acres we have chickens, plenty of fresh eggs, a variety of vegetables, milk, butter and cream—plus pork and bacon, plump geese, honey, fruit from dwarf trees, berries, etc. It's all the result of planned *spare-time* farming.

Carolyn and I have put the whole story into an 84-page illustrated book—which is yours for FREE EXAMINATION.

Ed Robinson.

All This—AND MORE—for ONLY $1

1. Houses Especially Designed for Country Living
2. Plan a "Harvest Room" With Your Wife
3. Score Card for Buying Country Property
4. Water, Sanitation, Electricity, Roads
5. Landscape Your Place—Increase the Value 20%
6. Plans for a Small Barn
7. A Good Garden With a Lot Less Work!
8. Vegetable Planting Chart
9. The Kind of Berries and Grapes Money Can't Buy
10. Two Ways to Have Tree Fruits on a Small Place
11. Fresh Eggs from Your Own Hens
12. Geese Grow on Grass
13. Turkeys Can Be a Profitable Side Line
14. Ducks are Easy to Raise
15. Rabbit is Delicious—Costs Less to Produce
16. Ham, Bacon, Pork, Lard—a few cents a pound
17. The Miniature Dairy
18. A Few Sheep for the Small Place
19. Bees — No Sugar Shortage Here
20. Cold Frames, Hotbeds, Small Greenhouses
21. Grow Your Own Fish!
22. Setting Up a Home Workshop
23. Earning Money in the Country
24. Most Helpful Reference Books

SEND NO MONEY (Unless You Prefer To)

Ed Robinson, P. O. Box 2805, NOROTON, CONN.
Dear Ed: Please send me a copy of your "Have-More" Plan. If I decide to keep it, I'll send you one dollar, plus the ten cents it has cost you for postage, packing and handling. If it doesn't please me, I'll send it back, owe you nothing, and we'll still be friends.

Your Name .....

Address .....

Zone No.
City ..... (if any) .... State .....

If you'd prefer to send a dollar now, that will be fine—save me a lot of record keeping and save YOU the ten-cent shipping charge. I'll give you DOUBLE your money back if you return the plan for any reason in 10 days. That's how sure I am you'll like it!

Copyrighted material

FOUNDED 1872

POPULAR SCIENCE

MECHANICS AND HANDICRAFT REG. U.S. PAT. OFF.

VOL. 152: NO. 5

EDITOR: Perry Githens

MANAGING EDITORS: Fred O. Newman, Volta Torrey. **ART EDITOR:** Howard C. Jensen.

MECHANICS & HANDICRAFT EDITOR: Harry Walton.

ASSISTANT MANAGING EDITORS: Hartley E. Howe, Frank Rowsome, Jr.

ASSOCIATE EDITORS: Alden P. Armagnac, Devon Francis, Robert Gorman, Sheldon Gallager, Herbert Johansen, Martin Mann, John F. Stearns, Robert P. Stevenson.

STAFF PHOTOGRAPHERS: W. W. Morris (Chief), Hubert Luckett.

WESTERN EDITOR: Andrew R. Boone (Los Angeles).

ART DIRECTOR: Harry Samuels. **ART ASSOCIATES:** Herbert Anthony, Eric Karminski, Jr., Richard Meyer, Saverio Rada, Frances Cooper (Production).

EDITORIAL ASSISTANTS: Mae G. Dyer (Assistant to the Editor), Julia Charnif, Carol Ennis, Charlotte Korch, Georgette Sparks, Ruth Westphal.

WASHINGTON CORRESPONDENT: John F. Loosbrock

PUBLISHER: Godfrey Hammond

CONTENTS FOR MAY, 1948

Cover painting by A. Leydenfrost

Science News

Picture of the Month..... 97
Tiny Sub Is Deep Diver.....106
Man Makes Matter.....121
Aerobee Soars 78 Miles.....145
Seagoing Lab Tracks Fish.....166
This Tube Remembers.....167

Science at Work

Blizzards on Call.....105
Jungle Buggy Packs a Load.....122
Who's The Winner?.....128
Nitrogen Shrinks Metal.....144
Double-Duty Cooker.....159
How Biggest Ozone Plant Works.....162
Tugs Hitch Ocean Ride.....165

PS Features

New Balloons Explore Roof of Airways.. 98
Printing Gets a New Look.....107
Torpedoes From Crossbow.....112
The Oyster Hoister's Here.....124
Portable Power Parcel.....125
Machines Turn Fields Into Factories.....129
Model Circus Rivals Real Thing.....135
How To Look at Linoleum.....139
Leapfrog Barge Swims, Walks, Climbs 146
The Man with the Biggest Squeeze.....154
How Elements Put on Disguises.....234

Aviation

Sea Suit Fits Flier's Pocket.....115
What's New in Aviation.....116
Huskies Hit the Silk.....153
Propeller Adjusts Itself.....164

Automobiles

Speed Kings Get Set for The "500".....126
Spiral Floor Eases Parking.....165
How an Expert Does a Tune-Up.....168
Gus Proves Economy Expensive.....172
Hints from the Model Garage.....176
Rims Changed for New Tires.....178
Lock Guards Your Hub Cap.....178
Trailer Hauls Boat to Water.....190
Gas Station Just Rolls Along.....198

Inventions

Curiosity Traps Mice.....105
Trees Covered Quickly.....120
New Ideas from the Inventors.....148
Furnace Fights Frost.....152
Retired Inventor's Home a Dream.....160

Photography

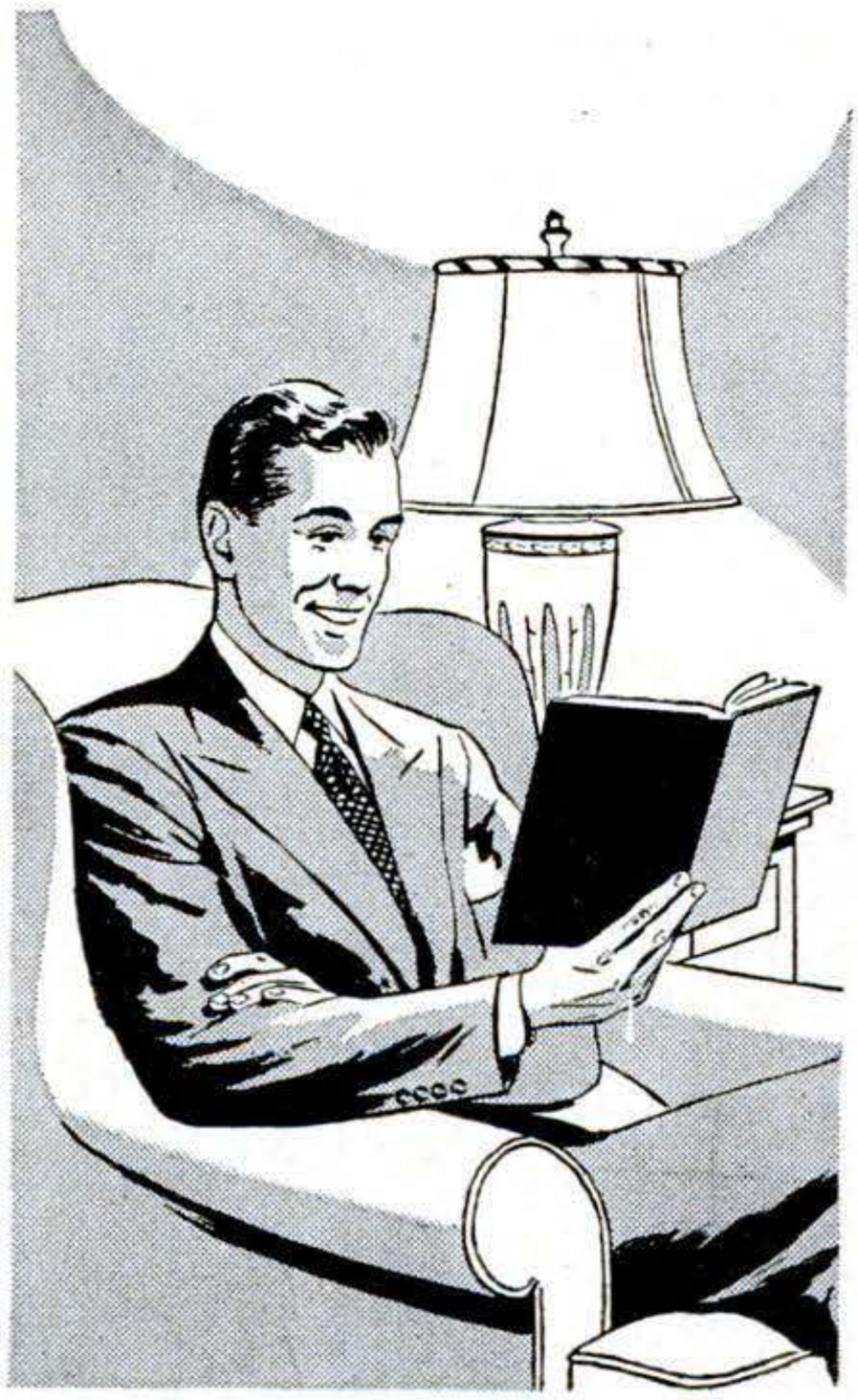
This Camera Can't Go Wrong.....150
Shoot with One Light.....216
Photo Ideas and Equipment.....218

Ⓣ *This mark in text indicates Trade Name.*

Continued on page 4

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc. Godfrey Hammond, President and Treasurer; R. C. Wilson, Raymond J. Brown, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A. Copyright, 1948, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, $2.50 (2 years, $4.50, 3 years, $6.00); foreign countries, $1 per year extra. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new addresses, including zone numbers.

DON'T READ ANOTHER WORD OF THIS ADVERTISEMENT



unless you're interested in a better job, a larger salary, greater responsibility! I. C. S. messages are not addressed to the idly curious—they're for the man who is curious with a purpose.

If you want to know how to start achieving advancement and success, we have important information for you.

We want to tell you that I. C. S. Courses covering more than 400 subjects are available for spare-time study at surprisingly low cost.

We want you to know that pay increases and job betterments are consistently reported to us by I. C. S. students in a volume as high as 600 and more letters a month.

Note, too, that successful I. C. S. graduates are numbered in the thousands and include presidents, production and research heads, superintendents, foremen in almost every branch of industry.

If you're truly curious, you'll want to know the details of what I. C. S. did for these men—and what it can do for you. The coupon brings you this full information. Mark and mail it *right now!*

INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

BOX 7606-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

Air Conditioning and Plumbing Courses
- ☐ Air Conditioning
- ☐ Heating
- ☐ Plumbing
- ☐ Refrigeration
- ☐ Steam Fitting

Chemistry Courses
- ☐ Chemical Engineering
- ☐ Chemistry, Analytical
- ☐ Chemistry, Industrial
- ☐ Chemistry, Mfg. Iron & Steel
- ☐ Petroleum Refining
- ☐ Plastics
- ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
- ☐ Architecture
- ☐ Architectural Drafting
- ☐ Bridge and Building Foreman
- ☐ Building Estimating
- ☐ Civil Engineering
- ☐ Coal Mining
- ☐ Contracting and Building
- ☐ Highway Engineering
- ☐ Lumber Dealer
- ☐ Reading Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications Courses
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Radio, General
- ☐ Radio Operating
- ☐ Radio Servicing
- ☐ Telegraph Engineering

Electrical Courses
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Lighting Technician
- ☐ Practical Electrician

Internal Combustion Engines Courses
- ☐ Auto Technician
- ☐ Aviation
- ☐ Diesel-Electric
- ☐ Diesel Engines
- ☐ Gas Engines

Mechanical Courses
- ☐ Aeronautical Engineer's, Jr.
- ☐ Aircraft Drafting
- ☐ Flight Engineer
- ☐ Forging
- ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Industrial Metallurgy
- ☐ Machine Shop
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Mold-Loft Work
- ☐ Patternmaking—Wood, Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Drafting
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting
- ☐ Ship Fitting
- ☐ Tool Designing
- ☐ Toolmaking
- ☐ Welding—Gas and Electric

Railroad Courses
- ☐ Air Brake
- ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Locomotive Fireman
- ☐ Railroad Section Foreman

Steam Engineering Courses
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Engineering
- ☐ Steam Electric
- ☐ Steam Engines

Textile Courses
- ☐ Cotton Manufacturing
- ☐ Rayon Weaving
- ☐ Textile Designing
- ☐ Woolen Manufacturing

Business and Academic Courses
- ☐ Accounting
- ☐ Advertising
- ☐ Arithmetic
- ☐ Bookkeeping
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Certified Public Accounting
- ☐ Commercial
- ☐ Commercial Art
- ☐ Cost Accounting
- ☐ Federal Tax
- ☐ First Year College
- ☐ Foremanship
- ☐ French
- ☐ Good English
- ☐ High School
- ☐ Higher Mathematics
- ☐ Motor Traffic
- ☐ Postal Service
- ☐ Salesmanship
- ☐ Secretarial
- ☐ Sign Lettering
- ☐ Spanish
- ☐ Stenography
- ☐ Traffic Management

Name_____ Home Address_____

City_____ State_____

Age_____ Present Position_____ Working Hours_____ A.M. to_____ P.M.

Special tuition rates to members of the Armed Forces. Special discount to World War II Veterans.
Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

Copyrighted material

Check List for Folks who do not use

PYROIL

Does Pyroil reduce wear by maintaining a film of oil on cylinder walls? ✓ yes no

Does Pyroil prevent corrosion and rust by protecting cylinder walls from attack? ✓ yes no

Does Pyroil permit easy starting by reducing friction load of "dry starts"? ✓ yes no

Does Pyroil eliminate accummulation of dirt, sludge, gum in crank case? ✓ yes no

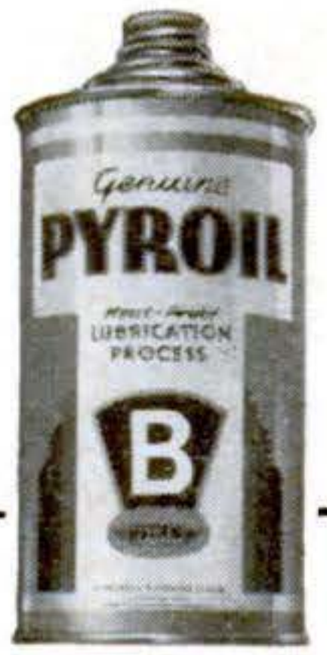
Is Pyroil easily available? Ask your gas station attendant. ✓ yes

PYROIL
for Aircraft Engines
Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

Manufactured and guaranteed by
PYROIL COMPANY
315 Main St.
La Crosse, Wisconsin

Canadian Distributors: Central Purchasing Agencies, Ltd., Toronto, Ontario

GIVEN!
An attractive PYROIL metal savings bank—takes coins up to 50c pieces — is yours for the asking sent postage paid.



PYROIL COMPANY
307 Main Street,
La Crosse, Wisconsin
I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

Name.....

Address.....

City or Town.....State.....

Mechanics & Shopwork

Squares on Plastic Enlarge Drawings....189
Empty Rifle Shells Rivet Metal.....196
Cement Holds Bandsaw Tires.....198
Polishing Strips Cut from Hat.....198
Spiral-Blade Bandsaw Cuts All Ways....206
Making Worm Drives to Order.....208
New Shop Ideas.....210
Finishing Up a Bench Mill.....212
Cutoff and Trepanning Tools.....215
Electric Engraving Tool Cuts Mortises..228
How to Seal a Finish into Wood.....230
New Engine Has Vertical Shaft.....233
Discarded Harrow Disks Used in Shop..237
Starting Hard-to-Reach Screws.....238

Home Mechanics & Handicraft

Turned Plastic Cigarette Holders.....180
Cherry Rack Sets Off Your Spoons.....181
Marine Bookcase Built of Pine.....184
Pie-Plate Candle Sconce.....188
New Ways You Can Use 5-Gal. Cans....190
Midget Firewood Baskets Serve Candy..191
New Case Covers Old Clock.....196
Carved Triceratops Adorn Bookends.....197
Bands Form Grip for Shaver.....198
How Cape Codders Build a Skiff.....200
Dog Leash from Speedometer Cable.....206
Babyproofing Your Home.....226
Homemade Crane Uses Fishing Reel....228
Bulb Heats Hog Water Tank.....228
Flag Bracket Made from Pipe.....229
Silencing a Noisy Clock.....237
Laying Nests Made of Cans.....238
Pulley Reverses Switch Pull.....239
Reflector Adds Shaving Light.....239
Windmills Scare Away Rabbits.....240
Iron Frame Turns Mower into Dolly.....240

Radio & Electricity

Glassless Lens Beams Radio Waves.....128
Tele Goes Movie Size.....145
Midget Switches with a Hair Trigger....192
Completing the Beginner's Set.....220
New in Electronics.....224
Radio Briefs.....225
Circuit Breaker Guards Motor.....232

Departments

Letters..... 16
Voice of Science..... 95
I'd Like to See Them Make.....138
Aids to Modern Living.....182
What's Your Ingenuity Quotient?.....199
Keeping the Home Shipshape.....204
New Tools.....207
Editorial Memo.....294

Copyrighted material

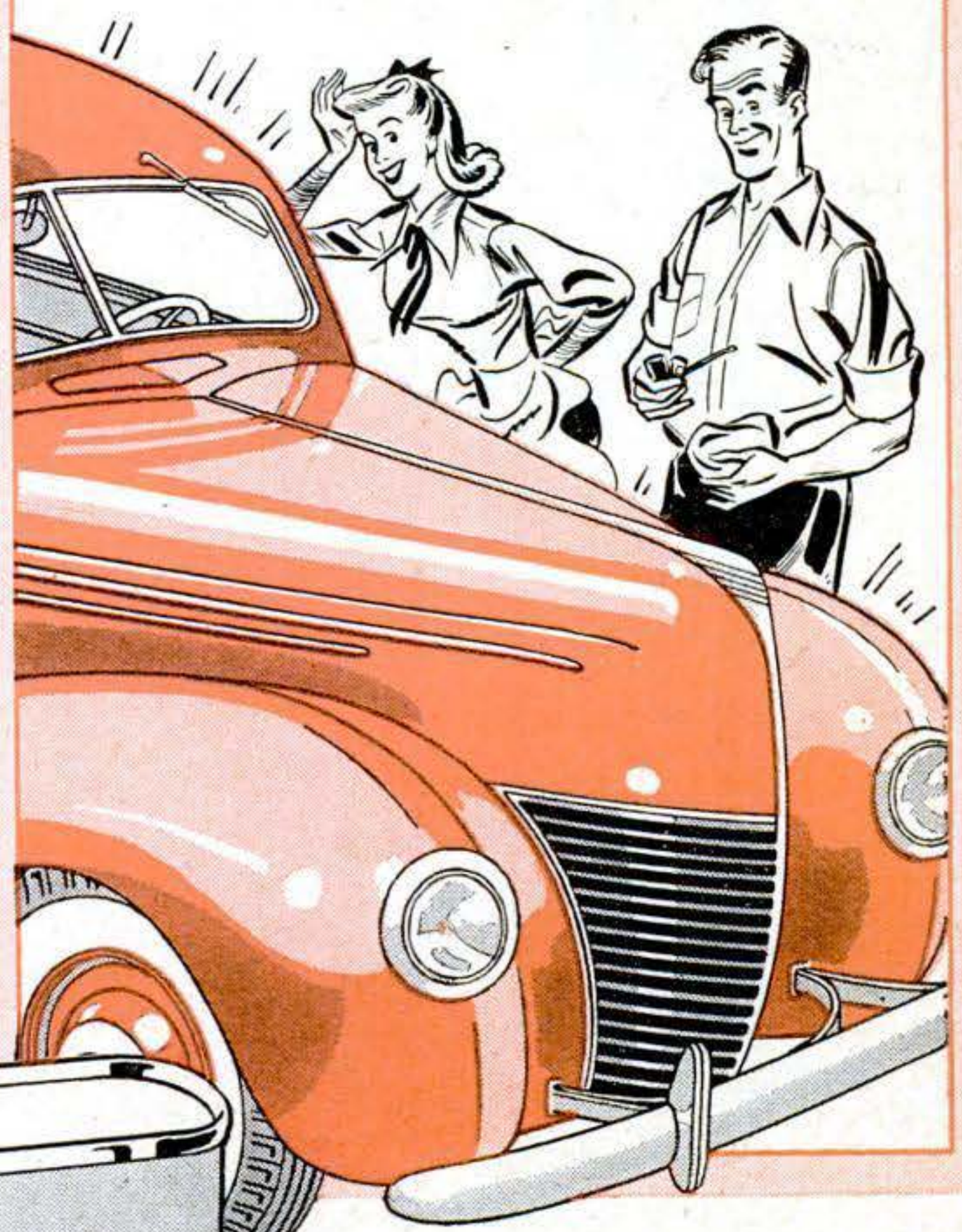
How one application of sensational liquid-type car polish does two jobs!

1 As you apply Carnu, it CLEANS!

So easy—just apply Carnu with a soft cloth. Rub only hard enough to loosen grime. The liquid dries quickly to a white powder.

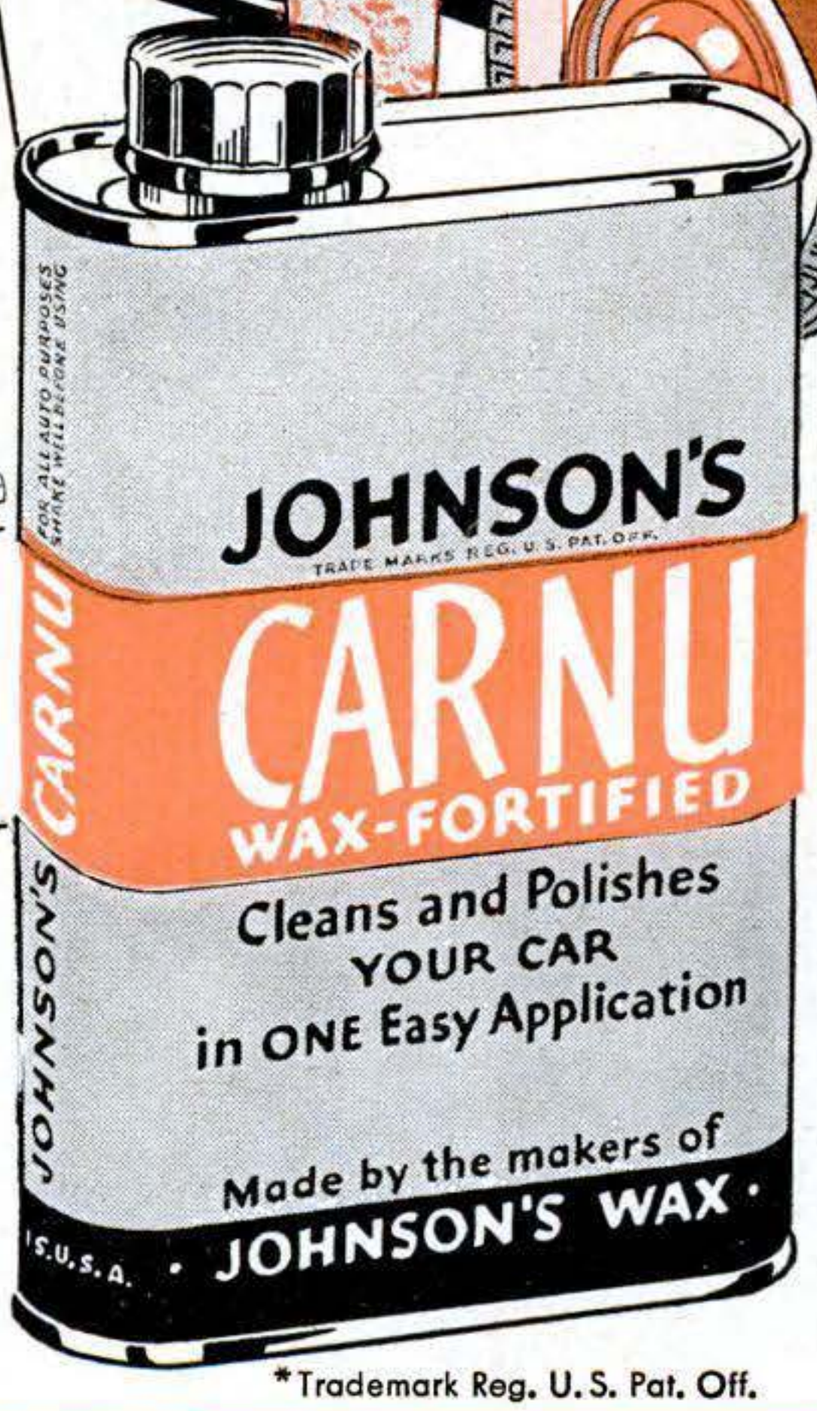
2 As you wipe Carnu off, it POLISHES!

Nothing to it! Powder-dry Carnu wipes off without hard rubbing—and takes dirt with it. Finish sparkles with a showroom shine. Carnu also polishes chrome fittings.



BEFORE CARNU The finish is dull and rough with dirt and oxidized paint.

AFTER CARNU The finish is bright as a mirror—so smooth that future dust and dirt flick off easily.



Get Johnson's Carnu* at filling stations, auto supply, hardware, department, grocery or variety stores.

Pull up a chair—they're on the air!
Fibber McGee and Molly
Tuesday Nights—NBC

For Extra Protection... Johnson's Auto Wax

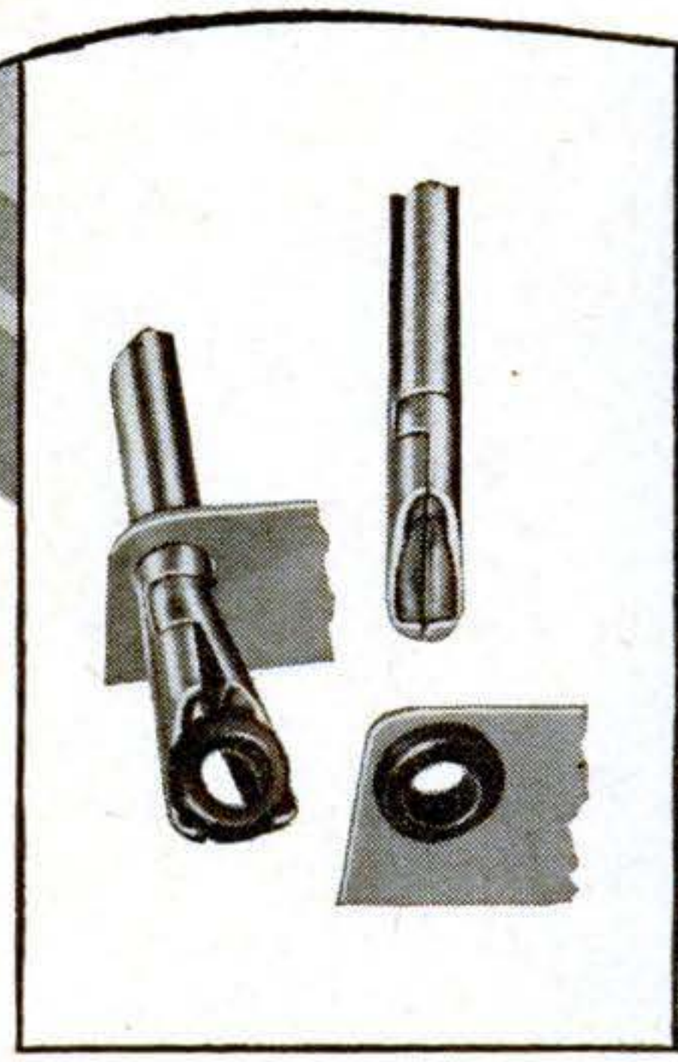
This easy-buffing wax is just the thing for any home handy-man who wants to give his car a professional finish. There's no better protective coating than Johnson's Auto Wax. It guards the finish against sun, heat, moisture. Easier, too, to keep your car clean and shining—dirt can't imbed itself in the smooth, hard, waxed surface. Johnson's Auto Wax is sold wherever Carnu is sold. Try it!

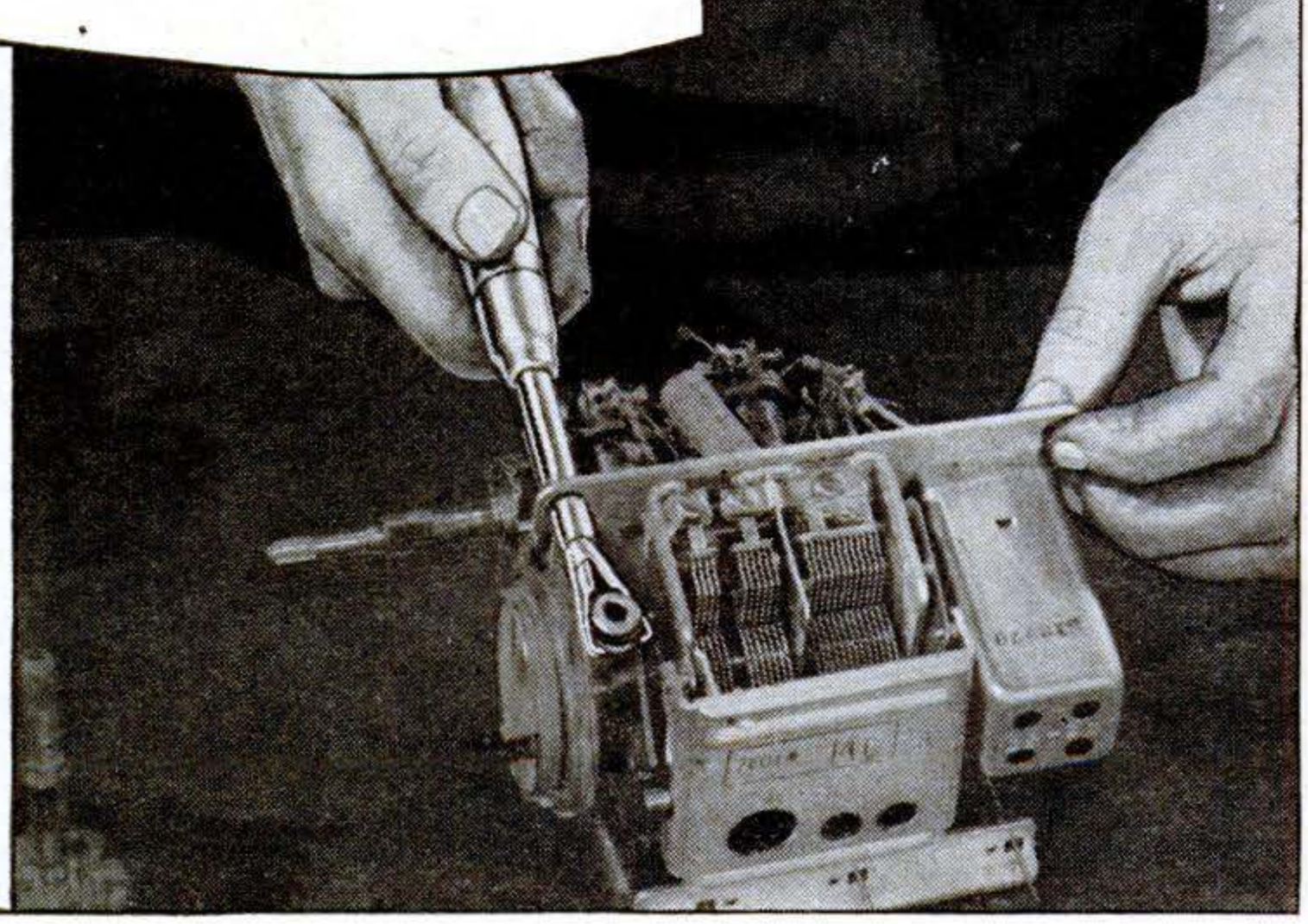
*Trademark Reg. U.S. Pat. Off.

© S. C. Johnson & Son, Inc., Racine, Wisconsin, 1948

Copyrighted material

Ingenious New Technical Methods To Help You Simplify Production





New Tool Inserts Rubber Grommets Quickly . . . Easily!

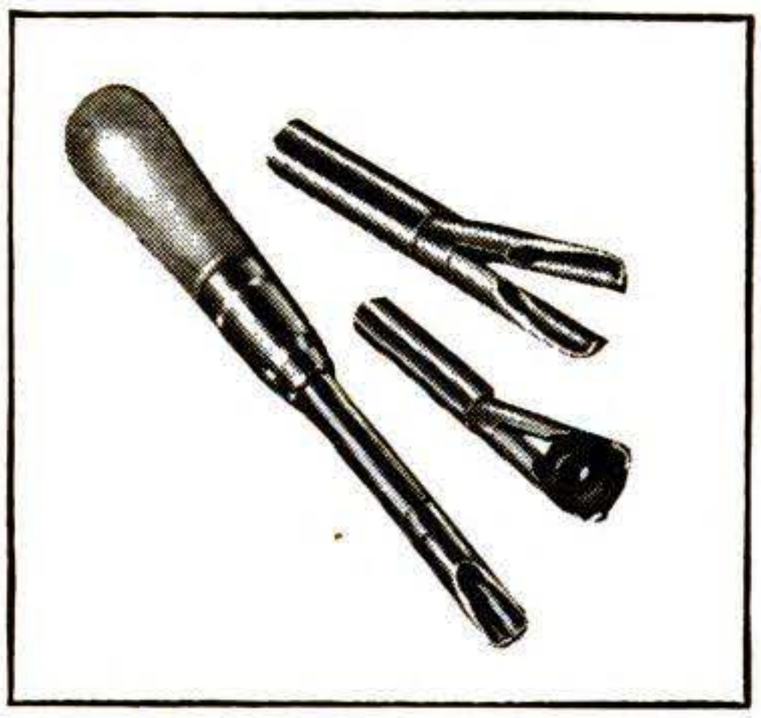
A new tool called a Grommet Inserter is shown above inserting a rubber grommet in a Sub-Chassis of a Zenith 7H820 Table Model Radio. The inset illustrates a close up view of the Grommet Inserter before and after the grommet has been inserted.

Anyone can insert grommets in an instant with the new Grommet Inserter. Saves time, labor, and assures perfect fit. No longer is it necessary to use the time-consuming, cumbersome method of insertion by hand. The new Grommet Inserter does it efficiently.

Simple as A-B-C. All you do is push the Grommet Inserter through the hole, open jaws, place grommet in jaws, and pull back—leaving grommet firmly in place, and perfectly fitted. Comes in four standard sizes: 1/4", 5/16", 3/8", 7/16". Can be furnished in any special sizes to order.

You can count on chewing gum, too, to help step up employee's on-the-job efficiency. Chewing gum helps relieve tension and thereby enables him to work quicker and easier while leaving hands free. That's why more and more plant owners are making Wrigley's Spearmint Gum available to everyone.

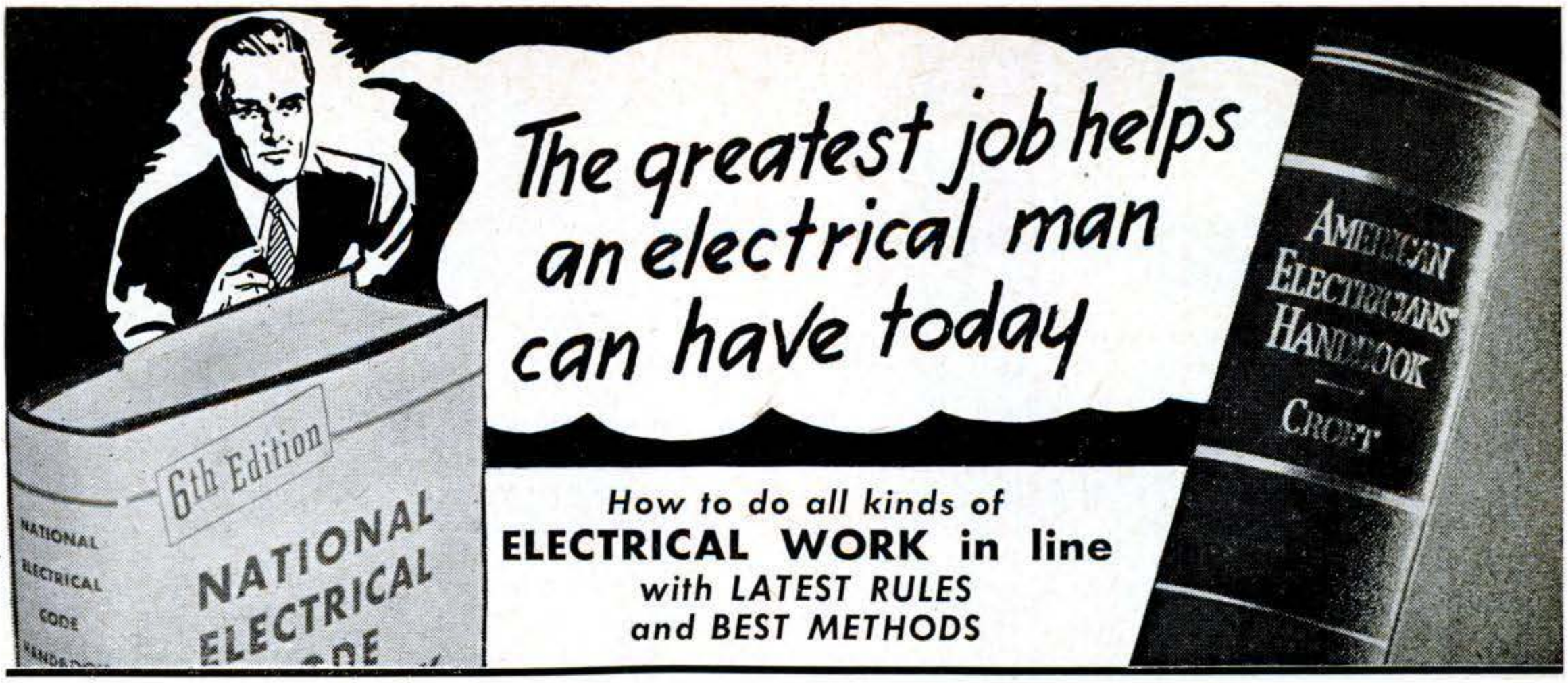
Complete details may be obtained from
D. B. Rich Manufacturing Co., 6217 Melvina Avenue
Chicago 30, Illinois



Grommet Inserter

AC-64

Copyrighted material



New 6th Edition

NATIONAL ELECTRICAL CODE HANDBOOK

By ARTHUR L. ABBOTT

633 pages, 421 illustrations, $4.00

1 This widely used handbook helps you get electrical work done quickly and easily according to the latest National Electrical Code. Gives rules and requirements for all jobs—what they mean—how to apply them. It enables you to understand the practical application of code requirements—refer to any point quickly with the assurance that no rule applying to the subject will be overlooked. Shows how to protect transformers from overload . . . how to install infra-red lamps . . . how to install capacitors for power-factor correction . . . wire ranges . . . install motors . . . shield high-voltage cables . . . plus hundreds of other procedures—all explained clearly with diagrams and sketches wherever needed.

ELECTRICAL MAINTENANCE AND REPAIR LIBRARY

5 volumes, 2042 pages, 1721 illus.

Contains the largest collection of practical methods for electrical repair and maintenance ever put together in book form. It includes in its 2042 pages every item of information likely to be of help to the electrical maintenance man . . . everything from fundamentals to specific trouble-shooting data . . . from drawing motor winding diagrams to figuring new windings for old cores. It tells how to turn down commutators . . . how to find shorts in armature windings . . . how to inspect and repair motor starters and switches . . . how to rewire a motor for different speeds and phases.

Hundreds of helpful diagrams

Clear, easy-to-read diagrams and photographs give you step-by-step procedures for every repair operation—covering a-c and d-c motors and generators, transformers, potential regulators, rheostats, controllers, etc. In over 30 pages of trouble-shooting tables this library shows you how to diagnose troubles in electrical equipment and how to take immediate steps to correct them. Imagine getting this on-the-job help for only a few cents per day! Check the free-trial easy-payment offer in coupon at right.

AMERICAN ELECTRICIANS' HANDBOOK

By TERRELL CROFT, Consulting Engineer
Revised by Clifford C. Carr
Over 1600 pages, 400 tables, 1200 illus.
$6.00

New 6th Edition JUST OUT

Now revised to comply with the latest code requirements and to include the best of today's practices in using electronic devices.

2 This book is packed from cover to cover with the **right** facts about practical electricity . . . Hundreds of detailed descriptions, rules, methods, pictures, and practical data to help you install, maintain, and operate all kinds of electrical equipment. Contains complete data on wires and cables . . . splicing . . . installation and care of motors . . . capacitors . . . lighting equipment—every fact and procedure you need to help you solve day-to-day problems in selection and installation of electrical apparatus.

Latest information on electronic circuits and tubes and other modern devices in industry

In this new sixth edition of a world-famous handbook you get hundreds of pages of up-to-the-minute information on electronic control of motors . . . dry-type transformers . . . copper-oxide and selenium rectifiers . . . amplidyne and rototrol control generators—plus scores more facts on modern industrial devices—giving you the fundamentals of construction, operation, and application of electronic circuits and tubes in today's industry. This book is known and respected by over a hundred thousand electrical men . . . Take advantage of our 10-day FREE-TRIAL OFFER today . . . Let it prove to you that it's the book you need to make your work faster, easier, and more efficient.

MORE ELECTRICAL HELPS

3. PRACTICAL ELECTRIC WIRING, by H. P. Richter. 3d Edit. $3.75

4. FLUORESCENT LIGHTING MANUAL, by C. L. Amick. 2d Edit. $4.00

5. FRACTIONAL HORSEPOWER ELECTRIC MOTORS, by C. G. Veinott, 2d Edit., $5.00

6. TROUBLES OF ELECTRICAL EQUIPMENT, by H. E. Stafford, 3d Edit., $4.50

7. PRIMER OF ELECTRONICS, by D. P. Caverly, $2.25

McGRAW-HILL BOOK CO., Inc., 330 W. 42d St., NYC 18

Send me the books encircled below for 10 days' examination on approval. In ten days I will remit for the books plus a few cents postage or return them postpaid.

1 2 3 4 5 6 7

☐ Send me **The Electrical Maintenance and Repair Library** for 10 days on approval. In 10 days I will remit only $2.50 plus a few cents postage, then $3.00 per month until $17.50 is paid; or return the books postpaid.

Name . . . . . .

Address . . . . . .

City and State . . . . . .

Company . . . . . .

Position PSM-5-48

Copyrighted material

WERE the great personages of the past victims of a stupendous hoax? Could such eminent men of the ancient world as Socrates, Pericles, and Alexander the Great have been deluded and cast under the spell of witchcraft—or did the oracles whom they consulted actually possess *a mysterious faculty of foresight?* That *the human mind can truly exert an influence over things and conditions* was not a credulous belief of the ancients, but a known and demonstrable fact to them. That there exists a wealth of infinite knowledge just beyond the border of our daily thoughts, which can be aroused and commanded at will, was not a fantasy of these sages of antiquity, but a dependable aid to which they turned in time of need.

It is time you realized that the rites, rituals and practices of the ancients were not superstitions, but subterfuges to conceal the marvelous workings of natural law from those who would have misused them. Telepathy, projection of thought, the materializing of ideas into helpful realities, are no longer thought by intelligent persons to be impossible practices, but instead, *demonstrable sciences,* by which a greater life of happiness may be had.

One of America's foremost psychologists and university instructors, says of his experiments with thought transference and the powers of mind—"The successes were much too numerous to be merely lucky hits and one can see no way for guessing to have accounted for the results." *Have you* that open-minded attitude of today which warrants a clear, positive revelation of the facts of mind which intolerance and bigotry have suppressed for years? *Advance with the times;* learn the truth about your inherited powers.

Let this free book explain

The Rosicrucians (NOT a religious organization) have been leaders in introducing the ancient wisdom of mental phenomena. Established throughout the world for centuries, they have for ages expounded these truths to those thinking men and women who sought to make the utmost of their natural faculties. Use the coupon below—avail yourself of a pleasing book of interesting information which explains how you may acquire this most *unusual* and *helpful knowledge.*

The ROSICRUCIANS
(AMORC)

USE THIS COUPON

Scribe J.P.G.
The Rosicrucians, AMORC,
San Jose, California.
I am sincerely interested in knowing more about this unseen, vital power which can be used in acquiring the fullness and happiness of life. Please send me, without cost, the book, "THE MASTERY OF LIFE," which tells me how to receive this information.

Name _____

Address _____ State _____

Copyrighted material

Accountancy Home-Study

made *interesting* and *practical* thru *problem method*

YOU know as well as we do that Accountancy fits many men for positions that pay three and five and ten thousand dollars a year—gives many other men unusual opportunity to start a profitable growing business of their own.

You probably realize also that the accounting profession faces the greatest opportunity it has ever had.

The only question is—just how practical is it for *you* to train yourself adequately in Accountancy through home study?

And the answer lies in the LaSalle Problem Method.

For this modern plan of training not only makes Accountancy study at home thoroughly practical but makes it interesting as well.

And here's how:

You Learn by Doing

Suppose it were your privilege every day to sit in conference with the auditor of your company or the head of a successful accounting firm. Suppose every day he were to lay before you in systematic order the various problems he is compelled to solve, and were to explain to you the principles by which he solves them. Suppose that one by one you were to work those problems out—returning to him every day for counsel and assistance—

Granted that privilege, surely your advancement would be far faster than that of the man who is compelled to pick up his knowledge by study of theory alone.

Under the LaSalle Problem Method you pursue, to all intents and purposes, that identical plan. You advance by solving problems.

Only — instead of having at your command the counsel of a single individual—one accountant—you have back of you the organized experience of a great business training institution, the authoritative findings of scores of able accounting specialists, the actual procedure of the most successful accountants.

Thus—instead of fumbling and blundering—you are coached in the solving of the very problems you must face in the higher accounting positions or in an accounting practice of your own. Step by step, you work them out for yourself—until, at the end of your training, you have the kind of ability and experience for which business is willing and glad to pay real money.

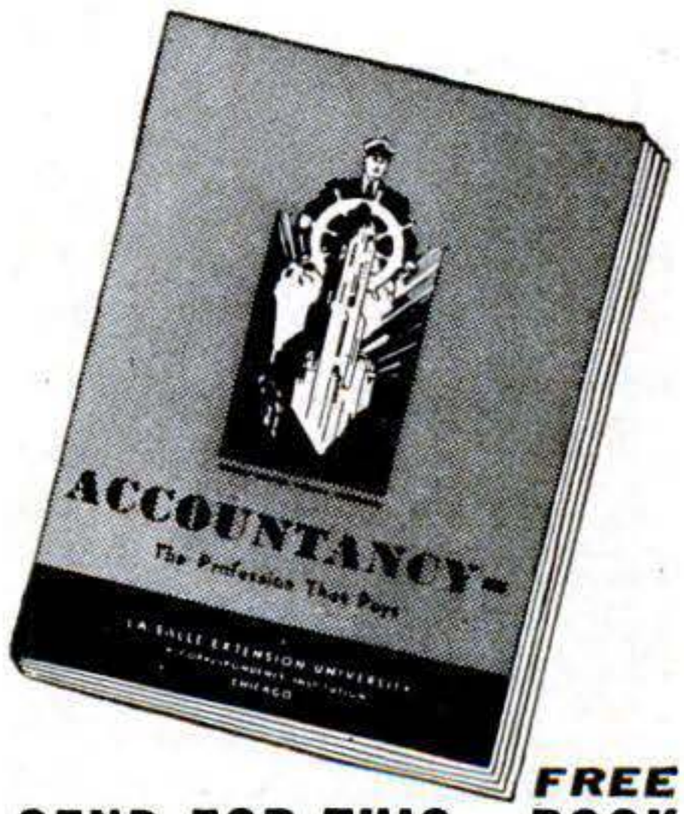
One-Tenth of All C. P. A.'s Are LaSalle Trained

If you want still more proof, remember that over 2600 C.P.A.'s—approximately one-tenth of all those in the United States who have passed the difficult examination for this coveted degree—are LaSalle alumni.

And knowing these facts, ask yourself if there can be any further question about the practicability of this training for you—ask rather if the real question is not about the size of your own ambition and the quality of your determination.

For Accountancy is no magic wand for the lazy or the fearful or the quitter—it offers success only to the alert adult who has the courage to face the facts and the will to carry on till the job is done.

If you are that individual, the coupon below, filled out and mailed, will bring you free the information that may open up to you the future of which you have dreamed — ability and income and success. Is it not worth getting that information?



FREE
SEND FOR THIS...BOOK

LaSalle Extension University

A Correspondence Institution

Dept. 583-H 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, your 48-page illustrated book "Accountancy, the Profession That Pays," telling about the profession of accountancy and your training for success in that field.

Name.....

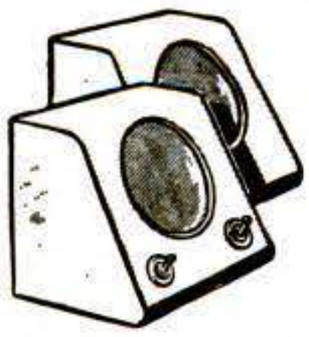
Address.....*City & Zone*.....

Position.....*Age*.....

Copyrighted material

ELECTRONIC KITS
For HOBBYISTS and EXPERIMENTERS

INTERPHONE
2-WAY CALL SYSTEM KIT



Ideal call and communication system for homes, offices, factories, stores, etc. Makes excellent electronic baby watcher, easy to assemble with every part supplied including simple instructions. Distance up to 1/5 mile. Operates from 110-V A.C. 3 tubes, one master and one remote speaker.

Shipping Wt. 5 lbs.

$14.50

GN58 GENERATOR

Makes excellent home lighting plant, operated by wind propeller, waterfall, gas engine, or hand crank. Reduction gear allows full output at slow speed; supplies 6 volts at 2.45 amp., 425 volts at .115 amp. New. Add postage for 28 lbs. **$7.95**

DYNAMOTORS

C **$1.95**

A **$5.95**

B **$5.95**

An electric motor operating a generator on same shaft—hundreds of uses—gives high voltage from storage battery.

Dynamotor C—Input 28 volts, output 220 volts at 60 MA. Add postage for 6 lbs.

Dynamotor A—Input 12 volts, output 1000 volts at 350 MA. Shipping weight, 72 lbs.

Dynamotor B—Input 6 or 12 volts, output 500 volts at 160 MA. Shipping weight, 30 lbs.

GENERAL ELECTRIC TRANSMITTER-RECEIVER
FOUNDATION

A beautifully constructed tuner containing the best in variable condensers, coils, vennier dials, etc., at least $30.00 worth of parts, complete with conversion instructions to transmitter and receiver. Add postage for 20 lbs. **$2.49**

GENERAL ELECTRIC BC 645
TRANSCEIVER

10 times as powerful as a walkie talkie

$14.95

2 for **$27.00**

A brand new two-way communication set which cost the Army over $400.00 and is ideal for two way communication between house and cars, office, service trucks, ambulances, boats, etc. Range up to 15 miles in the 450 to 500 Megacycle band. Operates in the new citizens band. Supplied complete with 15 tubes and conversion instructions to operate from 110 V A.C. Add postage for 25 pounds.

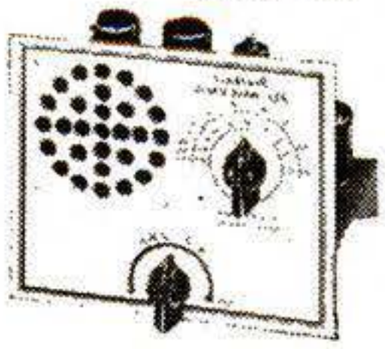
ACCESSORIES NEEDED

PE101C Dynamotor for 12 or 24 Volt storage battery operation $3.95
110 V A.C. Power Supply to operate BC 645 from house current $11.95
T-32 Table Microphone..... $2.95
Microphone Transformer.... $1.00
5" PM Speaker for BC 645 $2.80

HEATHKIT 3-TUBE ALL-WAVE RADIO

110-volt AC operation

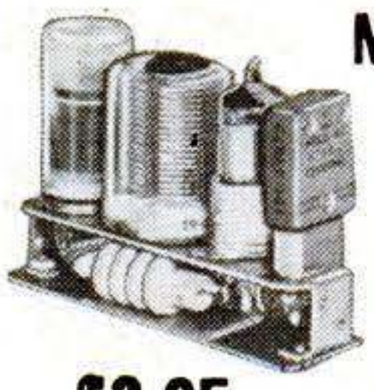
$5.95



An ideal way to learn radio. This kit is complete ready to assemble, with tubes and all other parts. Operates from AC Simple, clear detailed instructions make this a good radio training course. Covers regular broadcasts and short wave bands. Plug-in coils. Regenerative circuit. Operates loud speaker. Battery model for use where no AC house current is available. Add postage for 3 lbs.

Heathkit Beginners' Radio 110-volt type..... $5.95
Heathkit Beginners' Radio, battery type (2 tubes, no rectifiers) $5.95
Headphones for either type HS 30 per set $1.00
2½" permanent magnet loudspeaker for either type $1.95
Batteries, complete kit for battery type set ... $3.25

MIDGET TRANSMITTER KIT



$3.95

Complete kit to assemble a 1 Watt battery operated amateur 80 meter transmitter, including tube and crystal. Range up to 500 miles. Only accessories needed are sending key and batteries. Complete instructions supplied. Add postage for 2 lbs.

Key—add postage for 2 lbs. ... $1.00
Batteries—add postage for 4 lbs. $3.25

THE NEW 1948 HEATHKIT 5"
OSCILLOSCOPE KIT

Complete kit to build a beautiful 5" oscilloscope. Ideal for studying and servicing television and FM radio. 6 tubes including 5BP1 cathode ray tube. 1500-volt power supply operates from 110-V 60 cy A.C. Has compensated vertical and horizontal amplifiers and 15 cy to 30 KC sweep generator. Detailed instructions make assembly easy. Shipping weight, 35 lbs. Nothing else to buy **$39.50**

WRITE FOR LITERATURE ON HEATHKIT SERVICE INSTRUMENTS

MINIATURE HEADPHONES

$1.00 Hearing aid type, comfortable, keeps out outside noise, one of the army's best types. Add postage for 2 lbs.

T32 TABLE MICROPHONE

One of the army's finest built by Kellogg. Ideal for public address, transmitters, etc. Add postage for 5 lbs. **$2.95**

G. E. CIRCUIT BREAKER

$2.95 Protect your electrical equipment, eliminate fuses. 50 AMP 220 Volt rating. Add postage for 4 lbs.

MINIATURE MOTOR

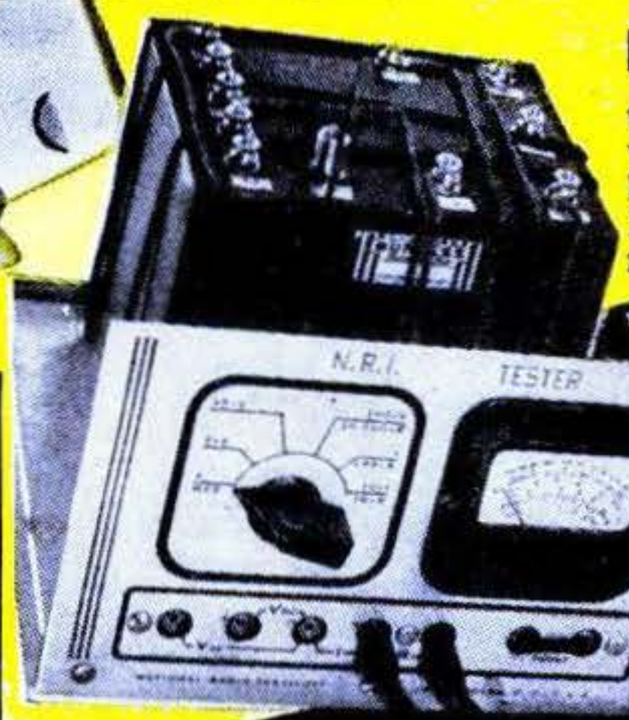
24V.D.C. size 1¼"x 1"x2" Add postage for 1 lb. **$2.95**

ORDER DIRECT FROM THIS AD
Include postage for weight shown. Print name and address. No orders under $2.00

The HEATH COMPANY
DEPT. S . . BENTON HARBOR, MICH.

Copyrighted material

KIT 1 (left) I send you Soldering Equipment and Radio Parts; show you how to do Radio Soldering how to mount and connect Radio parts; give you practical experience.



KIT 2 (left) Early in my course I show you how to build this N. R. I. Tester with parts I send. It soon helps you fix neighborhood Radios and earn EXTRA money in spare time.

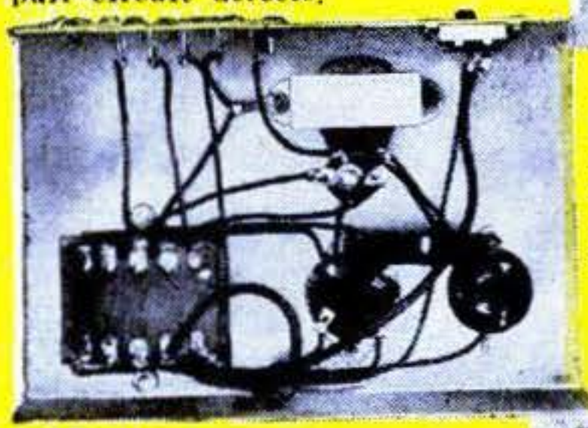
VETERANS

You can get this training in your own home under G.I. Bill. Mail coupon for full details.

Be a RADIO Technician
Learn by PRACTICING in Spare Time

with BIG KITS of RADIO PARTS I send you

KIT 3 You get parts to build Radio Circuits; then test them; see how they work; learn how to build special circuits, how to locate and repair circuit defects.



KIT 4 You get parts to build this Vacuum Tube Power Pack; make changes which give you experience with packs of many kinds; learn to correct power pack troubles.

KIT 5 Building this A. M. Signal Generator gives you more valuable experience. It provides amplitude-modulated signals for many tests and experiments.

KIT 6 You build this Superheterodyne Receiver circuit. You conduct FM (Frequency Modulation) experiments. You get more experience to help you win success in Radio.

My Course Includes Training in

TELEVISION • ELECTRONICS

FREQUENCY MODULATION

Do you want a good-pay job in the fast-growing Radio Industry — or your own Radio Shop? Mail the Coupon for a Sample Lesson and my 64-page book. "How to be a Success in RADIO—Television, Electronics," both FREE. See how I will train you at home—how you get practical Radio experience building, testing Radio circuits with BIG KITS OF PARTS I send!

J. E. SMITH, President
National Radio Institute

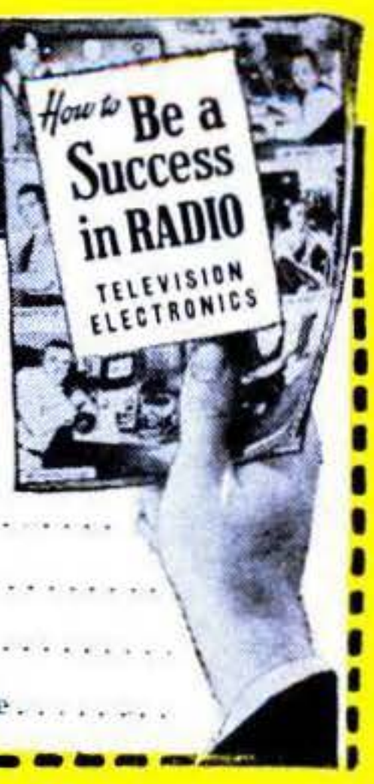
Many Beginners Soon Make Extra Money in Spare Time While Learning

The day you enroll I start sending EXTRA MONEY manuals that show you how to make EXTRA money fixing neighbors' Radios in spare time while still learning! It's probably easier to get started now than ever before, because the Radio Repair Business is booming. Trained Radio Technicians also find profitable opportunities in Police, Aviation, Marine Radio, Broadcasting, Radio Manufacturing, Public Address work. Think of even **greater** opportunities as public demand for Television, FM and Electronic devices continues to grow!

Find Out What NRI Can Do For You

Mail Coupon for Sample Lesson and my FREE 64-page book. Read the details about my Course, letters from men I trained; see how quickly, easily you can get started. No obligation! Just MAIL COUPON NOW in envelope or paste on penny postal. **J. E. SMITH, President, Dept. 8EP3, National Radio Institute,** *Pioneer Home Study Radio School,* **Washington 9, D. C.**

Sample Lesson 64 Page Book FREE



Mr. J. E. SMITH, President, Dept. 8EP3
National Radio Institute
Washington 9, D. C.

Mail me FREE, Sample Lesson and 64-page book. (No salesman will call.)

Age.....

Name.....

Address.....

City.....Zone....State.....

☐ Check if Veteran

Copyrighted material

NEW G-E

exposure meter

the meter with a MEMORY
. . . and so easy to use!

PRESS button . . . release . . . meter remembers light on scene.

SET . . . just line up Trident over pointer. A flip of your finger does it! (High and low light range to fit any scene.)

READ . . . correct exposure settings for better stills, movies, color in only five seconds!

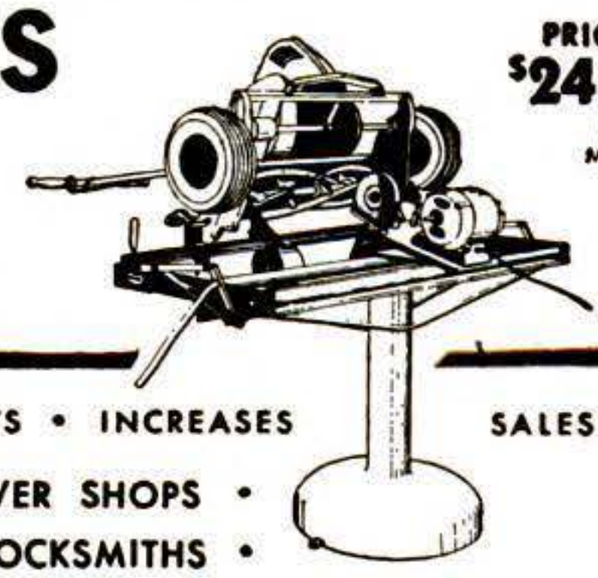
TYPE PR-1
$32.50*

Ask your photo dealer about it.
General Electric, Schenectady 5, N.Y.
Famous Type DW-58 meter only $19.95*
*In states where Fair Trade Contracts are in effect. Federal Tax included.

GENERAL ELECTRIC
606-23K

MODERN LAWN MOWER SHARPENER

PROFITS *and* SPEED



PRICE $241.50 LESS MOTOR

INCREASES PROFITS • INCREASES SALES!
FOR LAWN MOWER SHOPS • FIXIT SHOPS • LOCKSMITHS • HARDWARE STORES • GOLF COURSES • SCHOOLS PARKS • PLAYGROUNDS • INSTITUTIONS • CEMETERIES • AND ALERT INDIVIDUALS!

Sharpens All Reel Type Mowers • Hand, Power or Gang • 10 to 20 Minutes • No Dismantling No Extra Attachments Needed

All reel type mowers, from 5-inch edgers to 36-inch power mowers, are quickly sharpened to extreme ends of both left and right twist reel blades. Handle, wheels, roller and motor remain in place when sharpening is in process. Bed knife is sharpened in same brackets that hold mower in grinding position. No extra attachments required. One lever puts mower or bed knife in grinding position. 100% steel construction. Grinding head rides on five ball bearing races. Small, compact, easy to operate. Sharpens wood chisels, joiner knives and planer blades without extra attachments.

ORDER NOW
Immediate Delivery

Skate Sharpener Attachment Available

Send For Free Bulletin No. 11B

MODERN MFG. CO. 160 N. FAIR OAKS AVE PASADENA 1, CALIFORNIA

GET THIS COMPLETE GARDEN AND LAWN CART SET

ENDS HEAVY HANDLING AND HAULING

LAWN AND LEAF CART
Easiest way to haul leaves, grass and trimmings you ever saw. Holds 10 bushels each trip. Light, strong and sturdy frame. Mildew and rot proof bag. Folds flat to hang up when not in use. Sells individually for **$12.95.**

UTILITY TRUCK
No end of uses for this handy, patented truck. Open body carries stones, bricks, plants, soil, fertilizer. Closed body forms platform for baskets, ash cans, barrels, boxes, etc. Husky disc wheels and solid rubber tires insure quiet operation, don't mar lawn. Capacity 500 lbs. Folds flat to hang up when not in use. Sells individually for **$9.75.**

SPRAY TRUCK
Designed to carry 3 gal. spray tank as shown. Has many other uses such as golf bags, cans, etc. Tubular frame, sturdy construction. Heavy disc, rubber tired wheels. Rubber handle grip. Sells individually for **$7.95.** (Tank Not Included)

Make your garden work easier, lighter, more pleasant with this complete set. Will give years of service.

CONNIE BERT CO., 8115 Clinton Road, Cleveland 9, Ohio

Do you want

..to go to College?
..or to enter a Profession?

(Such as Accounting, Architecture, Nursing, Dentistry, Teaching, Social Work, Osteopathy, Beauty Culture, Optometry, Embalming, Chiropody, Law, Medicine, etc.)

..or get an Office Position?

To get anywhere, you practically MUST finish High School FIRST. You can complete our simplified High School Course in SPARE time at home, as FAST as your time and abilities permit. Equivalent to resident school work—prepares you for college, pre-professional examinations, business, industry. Standard texts furnished. Diploma. Credit for H.S. subjects already completed. Single subjects if desired. Low tuition, easy terms. American School, Chicago, est. 1897—endorsed by educators. Finish your high school education NOW. Write TODAY!

High School Course at Home

Many Finish in 2 Years

American School, Dept. H546, Drexel Ave. at 58th St., Chicago 37

Gentlemen: Send me FREE information covering special training in subjects checked below. No obligation on my part.

- ☐ High School Course
- ☐ Electronics, Industrial
- ☐ Architecture and Building
- ☐ Automotive Engineering
- ☐ Business Management
- ☐ Electrical Engineering
- ☐ Elec. and Gas Refrigeration
- ☐ Air Conditioning
- ☐ Railway Training
- ☐ Diesel Engineering
- ☐ Drafting and Design for Men and Women
- ☐ Plastics
- ☐ Private Secretary
- ☐ Mechanical Engineering
- ☐ Aviation
- ☐ Salesmanship
- ☐ Radio

Name .....

Address .....

Copyrighted material

AUDELS REFRIGERATION & AIR CONDITIONING GUIDE.....$4

New from Cover to Cover—1280 Pages, Fully Illus. Covering basic principles, servicing, operation & repair of household, commercial & industrial refrigeration & air conditioning. A gold mine of essential important facts for engineers, servicemen, users.

AUDELS CARPENTERS & BUILDERS GUIDES—4 Vols. $6

A practical illustrated trade assistant on modern construction for carpenters, joiners, builders, mechanics and all woodworkers. 4 vols., 1600 pages, 3700 illustrations, flexible covers. Pocket size. Each volume sold separately $1.50 a vol.

AUDELS AUTOMOBILE GUIDE.....$4

A practical quick ready reference book for auto mechanics, service men, operators & owners. Explains theory, construction & servicing of modern motor cars, trucks, buses & auto type Diesel engines. 1700 pages, fully illustrated. 55 chapters. Indexed. A standard book for mechanics. New fluid drive covered.

AUDELS DIESEL ENGINE MANUAL..$2

A practical, concise treatise with questions and answers on the theory, operation and maintenance of modern diesel engines including General Motors 2 cycle Diesel. 384 pages, fully illus., flexible binding, pocket size. All details plainly brought out, this book is of extreme value to engineers, operators & students.

AUDELS WIRING DIAGRAMS.....$1

210 Pages. Illustrated. Gives practical facts on wiring of electrical apparatus. It shows clearly how to wire apparatus for practically all fields of electricity. Each diagram is complete & self-explanatory. Highly Endorsed Pocket Companion.

AUDELS PLUMBERS & STEAMFITTERS GUIDES—4 Vols. $6

A Practical Trade Assistant & Ready Reference. Explains in plain language & by clear illustrations, diagrams, charts, graphs, pictures principles of modern plumbing practice including Marine Pipe Fitting and Air Conditioning. 4 Vols.—1670 Pages—3642 Diagrams. Pocket size. Each Vol. Sold Separately $1.50 a Vol.

AUDELS SHEETMETAL WORKERS HANDY BOOK.....$1

Practical inside information. Fundamentals of Sheet Metal Work. 388 pages. Illustrated. 11 sections. Clearly written. Essential & important facts, figures, pointers in everyday language. Ref. Index.

AUDELS SHEETMETAL PATTERN LAYOUTS.....$4

Developed by Experts for Sheet Metal Workers, Layout Men & Mechanics. A Practical Encyclopedia in 10 Sections, size 7 x 10 x 2—1125 Pages—350 Layouts—1600 Illustrations. 1001 Key Facts. Fully indexed for ready reference in answering your layout problems. Covers all phases of sheet metal work including Pattern Cutting, Pattern Development & Shop Procedure.

AUDELS ANSWERS ON BLUE PRINT READING.....$2

For Mechanics & Builders. Covers all types of blue print reading including ship & airplane. 416 pages, fully illustrated.

AUDELS NEW MACHINIST & TOOLMAKERS HANDY BOOK.....$4

Covers modern machine shop practice in all its branches. 5 practical books in 1. New from cover to cover. Tells how to set up & operate lathes, screw and milling machines, shapers, drill presses and all other machine tools. 1600 pages, fully illustrated, 5 x 6½ x 2. Indexed. 5 sections. 1—Modern Machine Shop Practice. 2—Blue Print Reading & How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule. 60 chapters. Easy to read and understand. A shop companion that answers your questions.

AUDELS MATHEMATICS & CALCULATIONS FOR MECHANICS $2

Mathematics for home study or reference. 700 pages, 550 illus. Practical mathematics from beginning. How to figure correctly. Easy, correct methods covering complete review. Illus. & Indexed.

AUDELS HANDY BOOK OF PRACTICAL ELECTRICITY.....$4

For maintenance engineers, electricians & all electrical workers. 1440 Pages, 2600 Illus. Covers important electrical information in handy form—including Marine Wiring, Radio Principles, Welding. Indexed. A Key to a practical understanding of electricity.

AUDELS RADIOMANS GUIDE.....$4

A key to the practical understanding of radio including Frequency Modulation, Television, etc., Aircraft & Marine Radio. For radio engineers, servicemen, amateurs, 914 Pages, 633 Illustrations & Diagrams. Photos. Review Questions & Answers, Reference Index. Authentic, clear, concise.

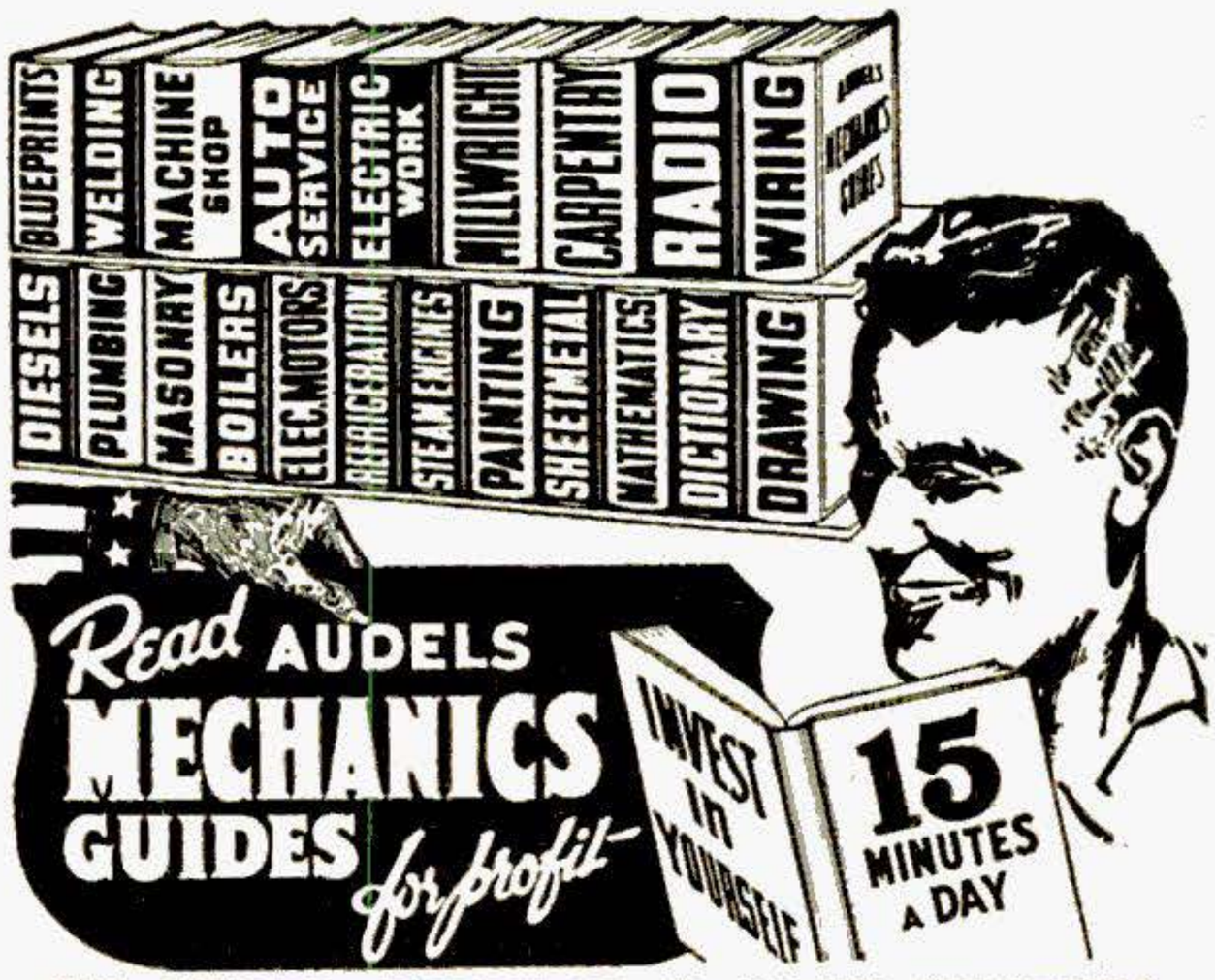
AUDELS ELECTRONIC DEVICES.....$2

Tells What You Want to Know About Electric Eye. Easily Understood. Covers photo-electric cells & their applications. Amplifiers, illumination, frequencies, voltage, photocell, tubes, Ohm's Law, wiring diagrams, etc.

AUDELS WELDERS GUIDE.....$1

A concise, practical text on operation & maintenance of all welding machines for all mechanics. Over 400 pages, illustrated. Covers all methods of electric and acetylene welding including airplane work.

AUDEL, Publishers, 49 W. 23 St., N. Y. 10



AN AUDEL GUIDE IS A GOOD FRIEND!

Step Up Your Own Skill with the Practical Facts and Figures of Your Trade. Save time and money with right methods, short cuts, labor saving ideas. CHECK NOW! You can look over any Audel Guide in your home. Start the Easy Payments if satisfied.

CUT HERE

MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., New York 10, N. Y.

Please mail me for 7 days' free examination the books marked (X) below. I agree to mail $1 in 7 days on each book or set ordered, and to further mail $1 a month on each book or set ordered until I have paid purchase price.

If I am not satisfied with Guides I will return them.

- ☐ Audels HOUSE HEATING GUIDE $4
- ☐ Audels ELECTRIC MOTOR GUIDE 4
- ☐ Audels OIL BURNER GUIDE 1
- ☐ Audels REFRIGERATION & Air Conditioning Guide . 4
- ☐ Audels POWER PLANT ENGINEERS GUIDE . . . 4
- ☐ Audels PUMPS, HYDRAULICS & AIR COMPRESSORS 4
- ☐ Audels WELDERS GUIDE 1
- ☐ Audels BLUE PRINT READING 2
- ☐ Audels SHEET METAL WORKERS Handy Book . . 1
- ☐ Audels SHEET METAL PATTERN LAYOUTS . . . 4
- ☐ Audels AIRCRAFT WORKER 1
- ☐ Audels MATHEMATICS and CALCULATIONS . . . 2
- ☐ Audels MACHINISTS & TOOLMAKERS Handy Book 4
- ☐ Audels MECHANICAL Dictionary 4
- ☐ Audels AUTOMOBILE GUIDE 4
- ☐ Audels DIESEL ENGINE MANUAL 2
- ☐ Audels MARINE ENGINEERS Handy Book 4
- ☐ Audels MECHANICAL DRAWING GUIDE 1
- ☐ Rogers MECHANICAL DRAWING and DESIGN . . 2
- ☐ Audels MILLWRIGHTS and Mechanics Guide . . . 4
- ☐ Audels CARPENTERS and Builders Guides (4 vols.) . 6
- ☐ Audels PLUMBERS and Steamfitters Guides (4 vols.) 6
- ☐ Audels MASONS and Builders Guides (4 vols.) . . . 6
- ☐ Master PAINTER and DECORATOR 2
- ☐ Audels GARDENERS & GROWERS GUIDES (4 vols.) 6
- ☐ Audels ENGINEERS & FIREMANS EXAMINATIONS 1
- ☐ Audels ENGINEERS and Mechanics Guides (8 vols.) . 12
- ☐ Audels Answers on Practical ENGINEERING . . . 1
- ☐ Audels ELECTRICIANS EXAMINATIONS 1
- ☐ Audels WIRING DIAGRAMS 1
- ☐ Audels Handy Book of PRACTICAL ELECTRICITY . 4
- ☐ Audels ELECTRICAL POWER CALCULATIONS . . 2
- ☐ Audels ELECTRONIC DEVICES 2
- ☐ Audels ELECTRIC Dictionary 2
- ☐ Audels RADIOMANS GUIDE 4
- ☐ Audels NEW ELECTRIC LIBRARY at $1.50 a Volume Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII

*Name*_____

*Address*_____

*Occupation*_____

*Employed by*_____ PSM

F. L. SPRAYBERRY, PRESIDENT of the SPRAYBERRY ACADEMY OF RADIO. This is the man who directs your study. His years of experience and Radio "know-how" assure you of the finest in home Radio Training!

I Put You to Work with Your Hands to LEARN RADIO! You Build Receivers! You Make Typical Defects Occur and Make Tests to Prove the Theory!

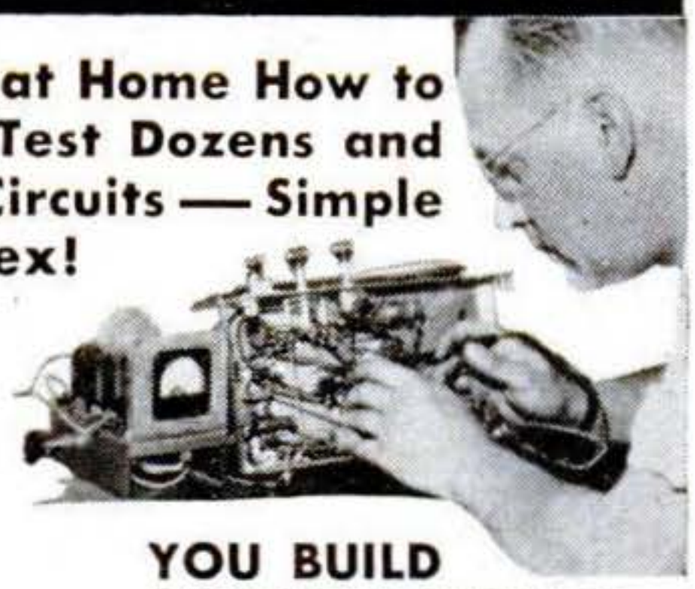
LEARN RADIO to MAKE MONEY!

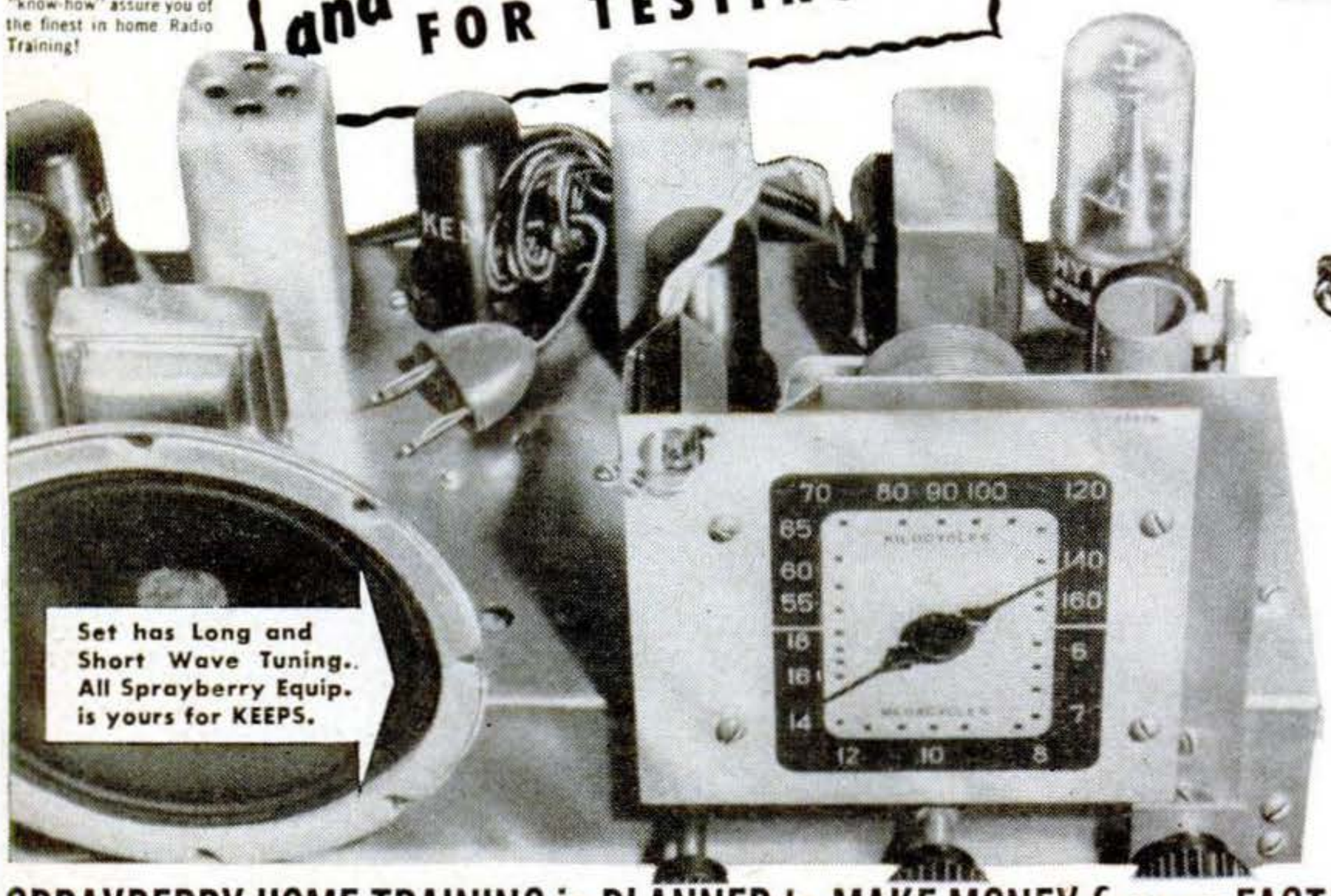
LOW COST TRAINING — EASY PAYMENT PLAN!

YOU GET 8 BIG KITS OF RADIO PARTS & EQUIPMENT including 2-BAND SUPER RECEIVER! and 16 RANGE METER FOR TESTING

You Learn at Home How to Build and Test Dozens and Dozens of Circuits — Simple and Complex!

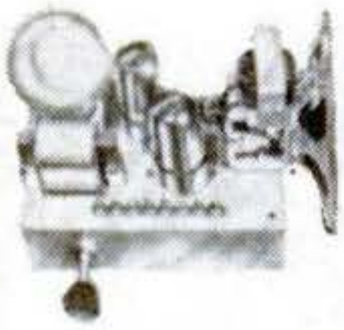
YOU DO OVER 175 INSTRUCTIVE EXPERIMENTS



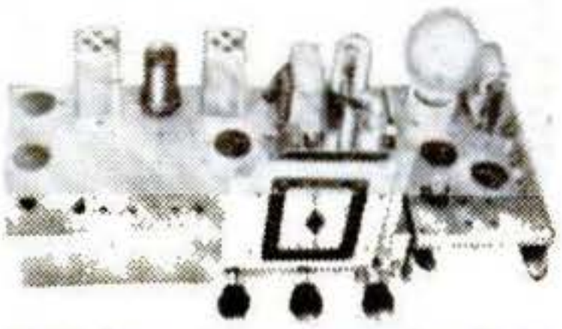


YOU BUILD ALL THESE TESTERS . . . . . AND MORE!

I give you a fine, moving-coil type Meter Instrument on Jewel Bearings — with parts for a complete Analyzer Circuit Continuity Tester. You learn how to check and correct Receiver defects with professional speed and accuracy.



You'll get valuable experience and practice building this Signal Generator and multi-purpose Tester. Makes a breeze out of fixing Radios and you don't have to spend money on ready-made Equipment.



Soldering, wiring, connecting Radio parts . . . building circuits with your own hands — you can't beat this method of learning. When you construct this Rectifier and Filter, Resistor and Condenser Tester, etc., you get a really practical slant on Radio that leads to a money-making future.

SPRAYBERRY HOME TRAINING is PLANNED to MAKE MONEY for you FAST!

I train you with regular professional Radio Equipment. I tell you exactly what to do . . . how to do it. You handle Radio Parts, see them operate, learn what they're for. With the fine Kits I supply, you learn how to build Radio Circuits, construct your own Test Equipment. I'll show you how to cause typical Radio defects so you can watch and see how they act. You learn the latest methods for trouble-shooting and repair. All this adds up to the finest kind of "bench" experience. And you get it right in your own home. In no time at all, you'll be ready for a business of your own or a good job in Radio, FM, Television, Radar, Industrial Electronics, etc. Now's the time to get started!

READ WHAT GRADUATE SAYS:

"One Job Nets About $26.00" . . . "Since last week I fixed 7 radios, all good-paying jobs, and right now I am working on an amplifier system. This job alone will net me about $26.00. As long as my work keeps coming in this way, I have only one word to say and that is 'Thanks' to my Sprayberry training and I am not afraid to boast about it." ADRIEN BENJAMIN, North Grosvenordale, Conn.

SEND FOR MY VALUABLE FREE BOOKS!

"How To Read Radio Diagrams and Symbols"

A wonderfully complete new book, which explains in simple English how to read and understand any Radio Set Diagram. Includes translation of all Radio symbols. Send for this volume at once! It's free! With it I'll send you another Big Free Book, describing in detail my Radio Electronic Training!

SPRAYBERRY ACADEMY OF RADIO
F. L. Sprayberry, President
Room 5558 Sprayberry Building, Pueblo, Colorado

Please rush my FREE copies of "How to MAKE MONEY in RADIO, ELECTRONICS and TELEVISION" and "How to READ RADIO DIAGRAMS and SYMBOLS."

Name _____ Age _____

Address _____

City _____ State _____

(Mail in envelope or paste on penny postcard)

Copyrighted material

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the U. S. Patent Office. For that reason, the Patent Office advises the inventor, unless he is familiar with such matters, to engage a competent registered patent attorney or agent to represent him. We maintain a staff of registered patent attorneys ready to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

Registered

Patent

Attorneys

CLARENCE A. O'BRIEN & HARVEY B. JACOBSON
Registered Patent Attorneys
82-E District National Bldg., Washington 5, D. C.

Please send me copy of "Patent Guide for the Inventor" and also "Record of Invention" form. This request does not obligate me.

Name_____

Address_____

City_____ State_____

(Please write or print plainly.)

CLARENCE A. O'BRIEN & HARVEY B. JACOBSON

82-E District National Building + Washington 5, D. C.

Copyrighted material

Learn RADIO -TELEVISION

in the GREAT SHOPS OF COYNE

Get ready for a better job, bigger pay NOW in Radio. Cash in with "All-around" knowledge of Radio — Television. Train on actual equipment. You learn easily at COYNE because it's real *shop* training. Thousands of graduates in Industry.

Not a "Home-Study" Course!

You get actual shop work on full-size equipment plus necessary theory. Whether you had previous experience or not makes no difference at **Coyne.**

Easy To Start Own Shop

Right along with our course, we include special training on how to operate your own Radio Shop.

GI Approved—Finance Plan for Non-Vets

EARN WHILE LEARNING

If you need part-time work to help out with living expenses while at **Coyne** we'll help you get it. Don't be held back by lack of money. Free employment service to graduates.

COYNE
Gives You All-Around Radio Training
RADIO MFG.
TELEVISION
FREQUENCY MODULATION (FM)
RADIO SERVICE (Your own shop)
SOUND SYSTEMS

SEND FOR FREE BOOK

Get the facts! BIG FREE BOOK tells about your future in **Radio** and **Television** and how you can prepare at Coyne. Dozens of pictures. No obligation—no salesmen will call.

Established 1899

MAIL COUPON TODAY!

B.W. COOKE, President
COYNE Electrical and Radio School
500 S. Paulina St., Dept. 8-4H, Chicago 12, Ill.

Please send me your Big Free Radio and Television Book and all the facts.

NAME.....

STREET.....

CITY..... STATE.....

Letters

Experts Approve

Sir:

Some time ago you were kind enough to grant us permission to reprint a feature from POPULAR SCIENCE, "Sandhogs' Toughest Job," in *The Laborer* [Official Publication of the International Hod Carriers', Building and Common Laborers' Union of America].

Please be assured that we deeply appreciate your courtesy in letting us use the excellent story.

J. M. RAGSDALE

Ransdell Inc.
Washington, D. C.

Tucker Talk

Sir:

We have just read your very interesting article on page 302 of your current [February] issue, captioned "Plain Talk About the Tucker."

Frankly, we cannot understand the basic reason for publishing this article since it obviously has only one purpose—to discredit the Tucker and the Tucker organization in general. In order that we may have some plain talk with you, as the head of Popular Science Monthly Magazine, our company is one of twelve hundred reputable dealers in the Tucker family. Down here in Texas, we speak straight from the shoulder and your so-called "editorial" comment on the Tucker is certainly not appreciated in this section of the country at least, and we are sure that there are several other million people who cannot appreciate the position you have taken in this matter through your comparison of the Buick Dynaflow with the Tucker's method of power transmission. Up to this point, we were under the impression that your magazine was definitely nonpartisan in bringing your readers information about automotive improvements. Undoubtedly, you have inadvertently lost a lot of reader respect through publishing this article concerning the Tucker automobile.

Perhaps, if you would send down one of your new reporters with a modern viewpoint, we feel that he could undoubtedly get the information he needs to satisfactorily pre-

Copyrighted material

INVENTORS

patent laws encourage the development of inventions

The Rules of Practice of the U. S. Patent Office advise—unless an inventor is familiar with such matters—that he employ a competent registered attorney or registered agent, as the value of patents depends largely upon the skillful preparation of the specifications and claims.

The firm of McMorrow, Berman and Davidson is registered to practice before the U. S. Patent Office. Additionally, it maintains a staff of attorneys able to readily understand inventors' disclosures, to advise concerning patentability, and to prepare appropriate specifications and claims for filing with the Patent Office.

If an inventor believes he has an invention, a search of the most pertinent prior U. S. patents should be made and a report obtained relative to its patentability. Where such report indicates that the invention appears patentable, in order to secure protection, diligence should be exercised in making application for a patent.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • TRADE MARKS • COPYRIGHTS

142-G VICTOR BUILDING, WASHINGTON 1, D. C.

McMORROW, BERMAN & DAVIDSON
Registered Patent Attorneys
142-G Victor Building, Washington 1, D. C.

Send me further particulars as to patent protection and procedure and "Invention Record" form at once. I understand that this request does not obligate me.

Name_____

Address_____

City_____ State_____

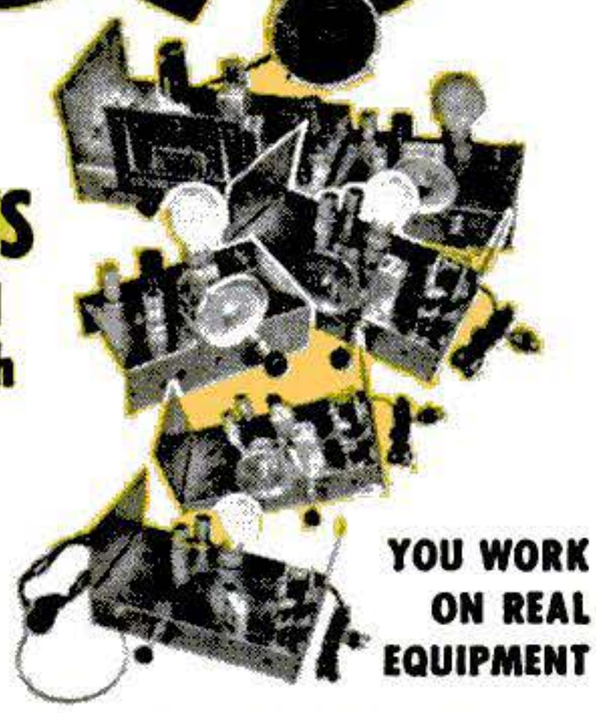
(WRITE OR PRINT NAME CLEARLY)

Copyrighted material

ACE Hollywood Experts
WILL TRAIN YOU AT HOME...
NOW YOU CAN MAKE GOOD IN

RADIO
TELEVISION ELECTRONICS

Through Practical Experiments With



YOU WORK ON REAL EQUIPMENT

10
BIG KITS
R.T.A.
Gives you!

You Do Scores of Practical Experiments

Illustrated above are only a few of the many job-exercises you do, through RTA's "shop-type" home training method. You build a TRF Receiver, a High-Frequency Converter, a 6-tube AC-DC Superhet Receiver, plus dozens of other interesting jobs.

These jobs give you actual SHOP EXPERIENCE necessary to your success.

FILL OUT COUPON AND MAIL TODAY!

Opportunities Wide Open

400 MILLION new radio and television sets will be built within ten years. 72 MILLION dollars are being spent RIGHT NOW for radio repairs alone! When you are trained by RTA's Hollywood Experts, you too can qualify for big, interesting GOOD-PAYING technicians jobs, or YOUR OWN profitable radio-television repair business.

Extra Cash in Spare Time

RTA's Hollywood Experts show you how to earn welcome EXTRA CASH, while you learn. In fact, like many RTA students, you may actually get MORE spare time work than you can handle.

25 Years of Success

RTA's long years of experience assure you quickest progress. If you are at all mechanically inclined, RTA can teach YOU to MAKE GOOD in Radio-Television.

SO GET THE FACTS! SEND FOR FREE 30-PAGE BOOK TODAY!

APPROVED FOR VETERANS

RADIO TRAINING ASSOC. OF AMERICA, DEPT. PSE
5620 Hollywood Blvd., Hollywood 28, Calif.
Send FREE BOOK showing how to make good in Radio-Television through training by Hollywood experts.

NAME _____ AGE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____
Check box if VETERAN of World War II

sent the Tucker in the manner in which it should be presented. It is only natural that the Tucker Automobile has a lot of men in the automotive industry worried and we are proud to be a part of this organization even though the part we play is very unimportant.

JAMES F. PIGG

Service Sales Co., Inc.
Dallas, Tex.

Sir:

Congratulations on your editorial "Plain Talk About the Tucker" in the February issue. You are right in not publishing press agents' claims as facts.

I am a collector of automotive literature and have been a student of automobile design for 20 years. . . . I have written letters to Tucker without getting a single fact about the car in return. . . . If the car will run, why not say how it runs?

I like your policy and I hope you continue it.

WILFRED R. FRANSON

Eugene, Ore.

PS will be glad to report on the Tucker when we can drive it, as we did Buick's Dynaflow.

Wrong-Way Stretch

Sir:

I think Mr. Fiske [What's your I.Q.—PS, Dec. '47, p. 185] was stretching his imagination as well as his shelf. If he received any money for his suggestion, he had better run right out and buy a new shelf, as this one is at least four inches too short.

E. P. SLUGG

Willow Grove, Pa.

Mr. Fiske stretched his shelf, all right, but the cartoonist stretched the imagination by showing the middle of the shelf longer after being cut than before. Actually, it remains the same, but, being wedge-shaped, pushes out the two ends, making a longer shelf with a narrower middle. Try it yourself with a cardboard cutout.

First Scientist—Aak?

Sir:

We were quite startled when we opened the February issue of PS and found ourselves looking at your editorial and the illustration of the bearded gentleman moving

Copyrighted material

ADVICE *for the* INVENTOR

The United States Patent Office advises the inventor, unless he is familiar with such matters, to employ a competent registered patent attorney or agent as the value of patents depends largely upon the skillful preparation of the specification and claims.

PRELIMINARY STEPS *toward* PATENT PROTECTION

The Evidence of Invention form mentioned below is offered as a convenience to the inventor in making his disclosure of invention.

The inventor should date and sign his disclosure and have it witnessed by two or more persons who are capable of understanding his invention. The disclosure should then be mailed to the registered patent attorney or agent whom he selects to assist him. The disclosure should be accompanied by a letter authorizing the patent attorney or agent to conduct a preliminary search in the Patent Office among previously granted U. S. patents for similar types of invention. The patent attorney or agent then prepares a report of the probable patentability of the invention and recommends the further course the inventor should take, provided the report indicates possible patentability.

Victor J. Evans & Co. . . . has a staff of experienced, registered patent attorneys available to assist inventors in the preparation and prosecution of their cases before the Patent Office. The coupon below is suggested as a convenience to the inventor in starting action on his invention.

VICTOR J.
EVANS & CO.

Merlin M. Evans

REGISTERED PATENT ATTORNEY
340-E MERLIN BUILDING, WASHINGTON 6, D. C.

Please send detailed patent information together with convenient "Evidence of Invention" form.

Name.....

Address.....

City and State.....

Copyrighted material

The Importance of Choosing a Long Established Technical Institute

Of utmost importance to anyone considering entering a technical institute, is that organization's history — also its facilities, faculty, and record of successful alumni. The Milwaukee School of Engineering, for 44 years has been training men for specific and substantial careers in industry. More than 35,000 former students now in industries the world over attest the career-building value of the Milwaukee School of Engineering, through its exceptional facilities in buildings, shops, laboratories, classrooms — and the comprehensive, practical technical courses under the supervision of its faculty of 72 specialists.

SPECIALIZE IN 6 MONTHS TO 3 YEARS

COURSES

SERVICE
6 to 12 Months
- Electricity
- Welding
- Refrigeration
- Heating

TECHNICIAN
1 to 2 Years
- Electricity
- Radio
- Electronics
- Refrigeration, Heating and Air Conditioning

PROFESSIONAL
3 Years
- Electrical Engineering Bachelor of Science Degree

Major in Machinery or Electronics

Our time-tested CONCENTRIC SYSTEM enables you to build your career step by step. Each 6-month course is complete in itself, yet prepares you for advanced courses. You train as long as circumstances permit — until you reach the "top step" in your desired occupational objective. 1,538 students now enrolled from 48 states and 13 overseas countries.

Terms Start July, September, January

MILWAUKEE SCHOOL of ENGINEERING
A Technical Institute

MAIL COUPON TODAY!

Milwaukee School of Engineering, Dept. PS-548
N. Broadway and E. State, Milwaukee, Wisconsin

Without obligation, send me free booklet "Career Building" and more details on course in.....

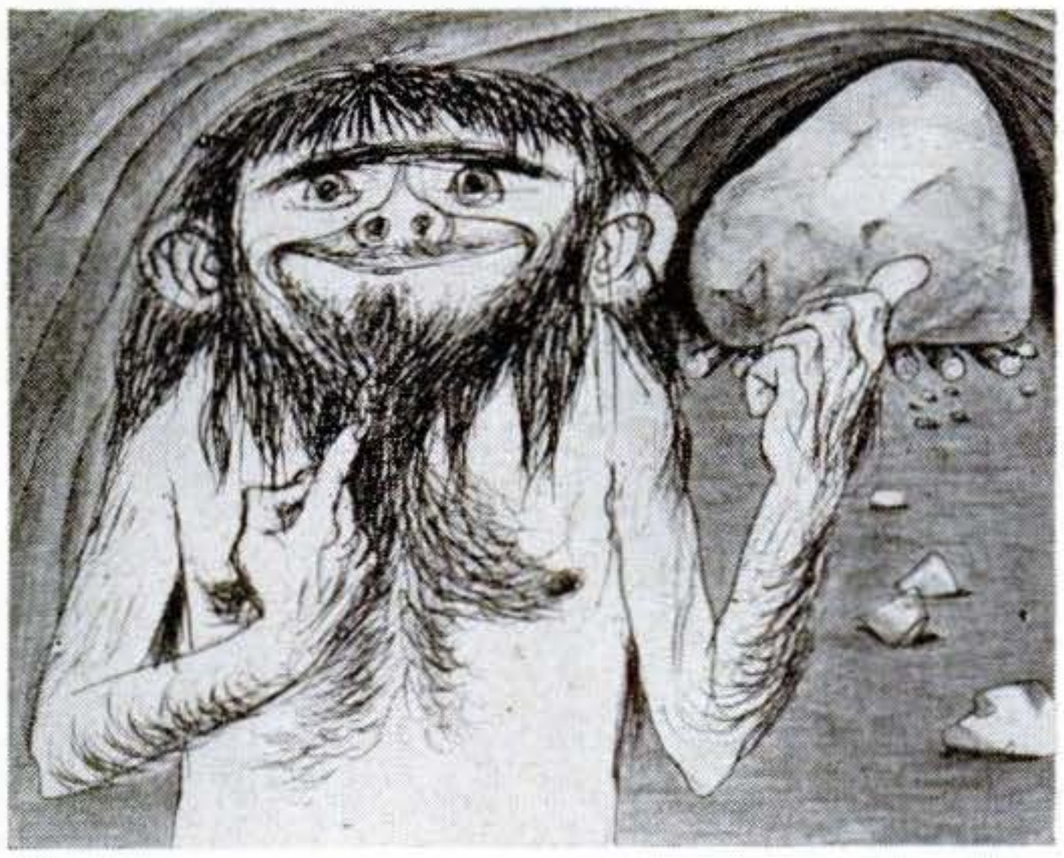
Name ..... Age .....

Address .....

City ..... State .....

the rock. We still don't know whether to credit telepathy or coincidence with an assist.

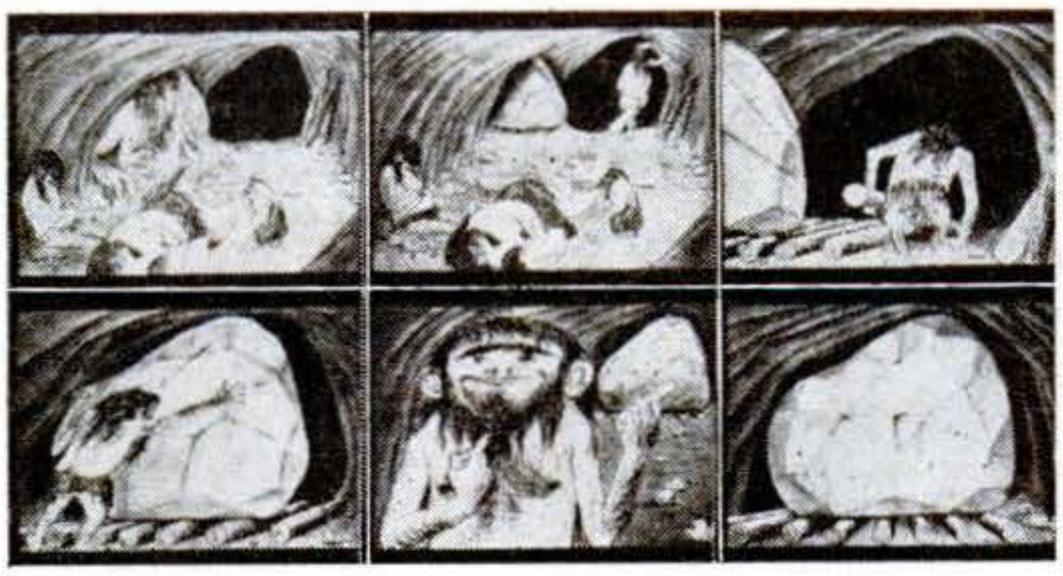
I have used this illustration many times in talks on conveying systems as a possible beginning of the art of mechanical handling,



and late this year we came out with a slide film for college use in which we used the cave man as our illustration. Your man is handsomer, I must admit, than Aak, our hero.

I think you will be amused at the parallel so am inclosing a close-up of Aak [above] and the first few frames of the film [below].

R. C. SOLLENBERGER
Conveyor Equipment Manufacturers Assn.
Washington, D. C.



Since we were both trying to begin at the beginning, it was only logical that we should both start with "A" for "Aak."

Why Doesn't Henry Spin?

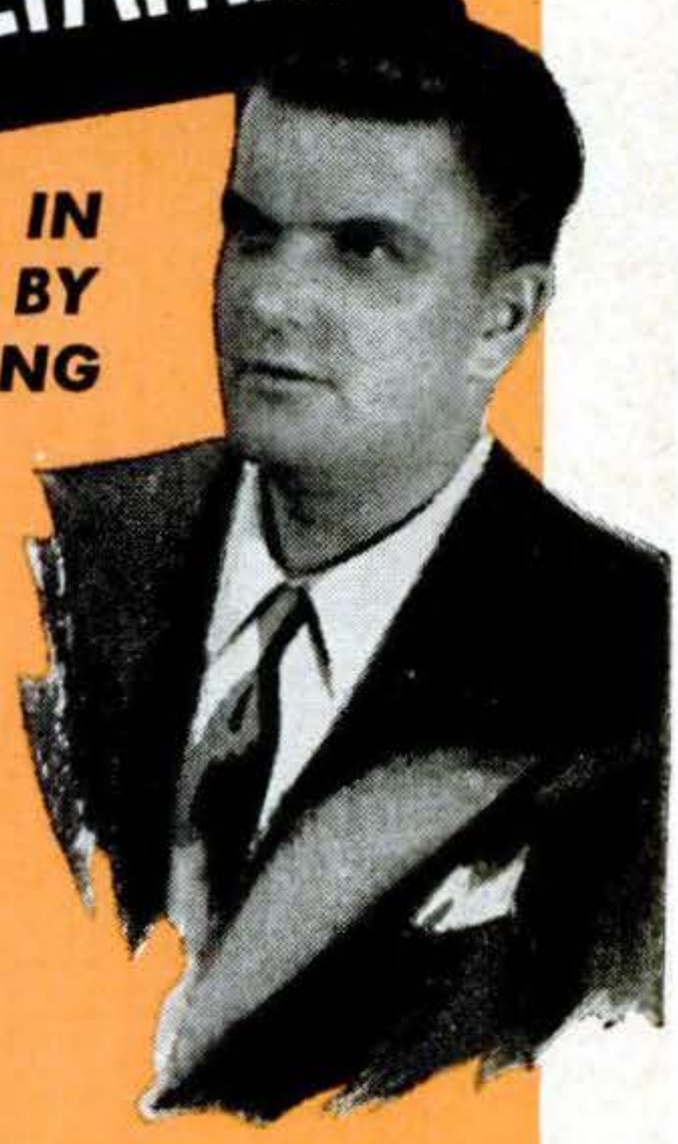
Sir:

On page 140 of your February issue, a picture appears with the heading "Ramjets Hoist Little Henry." As far as I can see, it appears to have only one prop. Pray tell me why the body itself does not spin around? I always thought a helicopter had to have

Copyrighted material

I will teach you... ELECTRICAL APPLIANCE REPAIRING

LEARN IN YOUR OWN HOME BY BUILDING, TESTING, REPAIRING



S. T. CHRISTENSEN
President & Founder

• Learn this fascinating, big money-making business. Repair all kinds of electrical appliances. Millions now in daily use will eventually require repair. Thousands of new appliances sold daily in all parts of the country! These unlimited prospects mean you will always have places to do profitable jobs. If you are mechanically inclined (can hold and use tools), you can qualify for this big steady-paying field. It is not at all unusual for appliance repairmen to charge on the basis of $5.00 to $6.00 an hour! WE TEACH YOU EVERYTHING! What trouble to look for, how to detect it, and how to quickly repair the appliance! Our course is written in simple, easy-to-understand language, is profusely illustrated with photographs and drawings and shows you each and every step! Also shows you how to build the power tools you need. Our FREE advisory service is yours for LIFE! Should intricate technical problems arise or the need for a special repair part, simply call on us! We teach you how to solicit business and how to keep it coming to you! Not a theory course but a practical, honest-to-goodness course written by and used by repairmen the country over. Price of course is so low the repairs on your own appliances should pay for it many times over.

New Electronic Kit Does All!

AND BEST OF ALL I'LL SEND IT TO YOU

• Knowing how valuable Practical Shop Training Experience is, particularly in the Electrical Field, I will send to you the CHRISTY ELECTRONIC KIT. It will be sent to you completely unassembled, together with detailed instructions on how to assemble this portable all-purpose, electric trouble finder! Read the partial list of its multiple uses listed below and realize how valuable and helpful such a kit will be to you! Every part is sent to you including the lightweight case, precision meter, jacks, etc., etc., even down to the very last screw! In addition to the practical electrical experience just assembling this kit will provide, we also include complete instructions as to the many, many ways this delicate instrument can be used by you. It took us years of academic training and years of hard work to obtain the knowledge this kit will give you. The combination of our Course and Electronic Kit will go a long way towards ASSURING YOUR SUCCESS.

MODEL 390 TESTS

- Current Consumption
- Heat Controls
- Electrical Circuits
- Motor Windings
- Shorts
- Refrigerators, Radios
- Irons, Fans
- Washing Machines
- Motors
- House Wiring, etc.

RUSH COUPON NOW

CHRISTY SUPPLY CO.
2835 N. Central Ave., Dept. D-6401
Chicago 34, Illinois

Please send me free illustrated literature about America's Fastest Growing Industry—ELECTRICAL APPLIANCE REPAIRING.

Name.....

Address.....

City.....*State*.....

Copyrighted material

"More Time—More FUN"

Says **Ben C. Robinson,** noted outdoorsman and outing editor, with a **Coleman Folding CAMP STOVE**

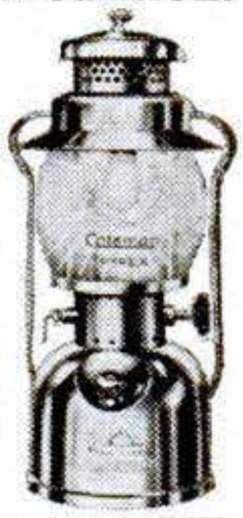
"I do my cooking with a Coleman Camp Stove and light up the camp with my Coleman Lantern," says Mr. Robinson. "The good old days of the campfire are mighty fine to think about ... but the smoked pots and pans, the smudged food and the cut and burned fingers have for me, at least, gone into the limbo of past events."

NOW—COOK WITH GAS ANYWHERE

Take a tip from famous outdoormen who make outdoor life their *business* — and have more time for fun with a Coleman Folding Camp Stove. Cooks like a city-gas stove—lights instantly. Folds up, carries like a suitcase. Folding High Stand (extra) holds stove at convenient height. Ask your Hardware or Sporting Goods Dealer for a demonstration.

Easy to Carry

FISH LATER— Have More LUCK with a Coleman Floodlight Lantern



Coleman Floodlight Lantern gives you more time for fun—better luck! Lights up 100-ft. area. Safe—a 105-mile gale can't put it out. Ask to see it demonstrated.

FREE FOLDER!

THE COLEMAN COMPANY, INC.
Dept. 232PS, Wichita 1, Kansas
Gentlemen: Please send, without obligation, FREE illustrated folders on Coleman Camp Stoves and Floodlight Lanterns.

NAME .....

ADDRESS .....

Help Prevent Forest Fires — COOK SAFELY

either another main rotor or a tail rotor to overcome torque. . . .

CLINTON L. ROSSITER, JR.
Roxbury, Conn.

"Little Henry" isn't a normal helicopter, remember. Its motive power is in the rotor itself and doesn't need a fuselage to push against—which is where torque comes from with a reciprocating engine. Besides, there's that big vertical tail stabilizer.

Wild, Hell, or Bearcats?

Sir:

While reading the February issue of POPULAR SCIENCE, I came across an article on page 124, and some of the information seems to be wrong. The planes on the flight deck are not FM-2 Wildcats but F6F Hellcats.

I was stationed on a naval air base operating FM-2s and aboard a carrier operating F6Fs, as shown on the carrier's deck.

CHARLES H. MAYER

To help unscramble its "cats," PS decided to call on the Navy—which comes up with still another one:

Sir:

The plane pictured on page 124 of the February PS is an F8F Grumman Bearcat. There is no other plane having a four-bladed propeller, straight wings, and the bubble located in such a way. Five specialists in the Aviation Section all agree.

COMDR. WILLIAM J. LEDERER, U.S.N.
Office of Public Relations
Department of the Navy
Washington, D. C.

Professor PS on the Platform

Sir:

I plan to make a short speech illustrating the material covered in your article on the Buick Dynaflow drive [Feb. '48, p. 113] in my seminar class at the New York University College of Engineering.

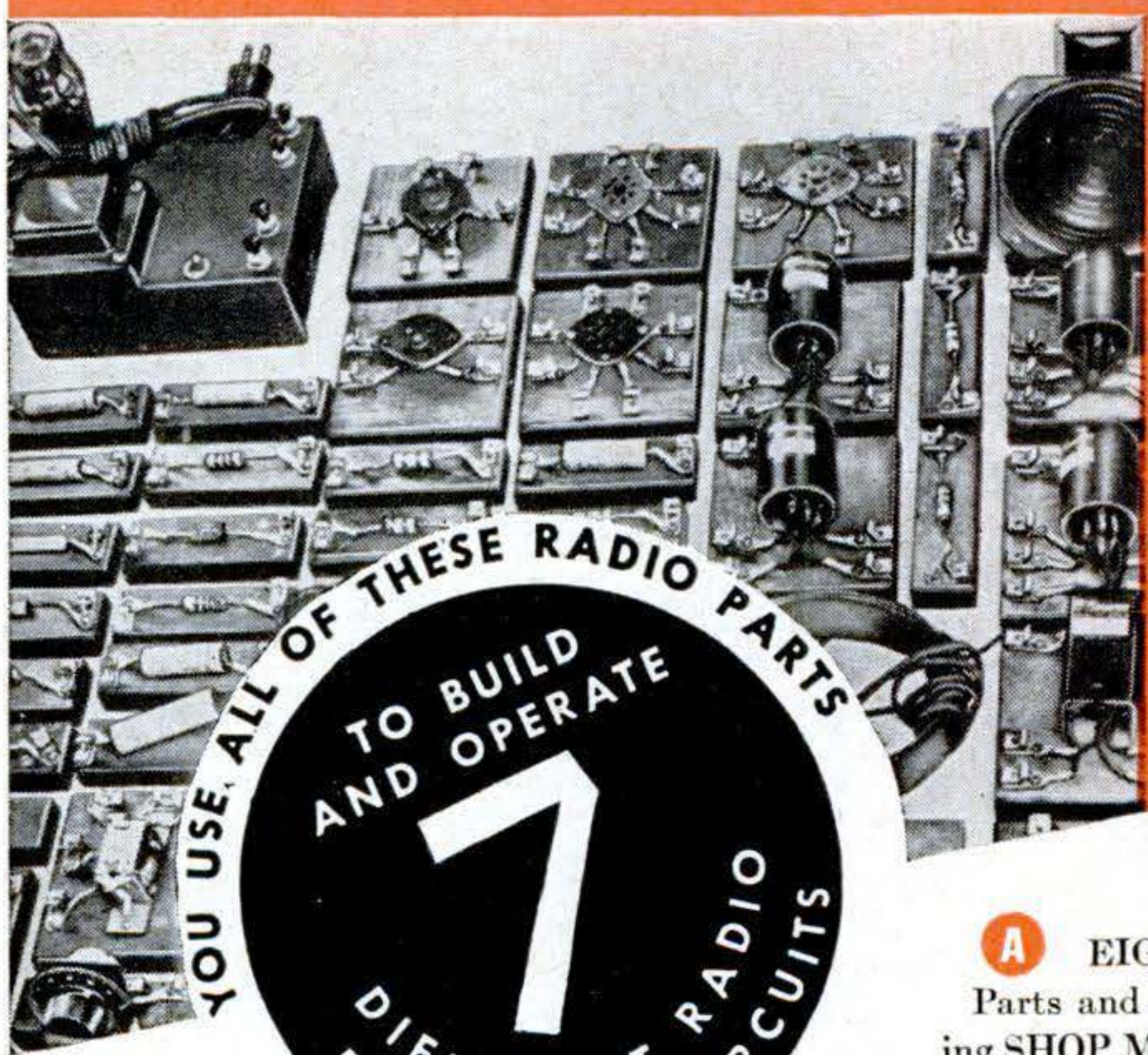
I would appreciate it immensely if you could supply me with diagrams similar to those in the article but magnified approximately five times. . . .

JOSEPH MARCUS
Port Chester, N. Y.

PS is happy to help N.Y.U. and is sending Mr. Marcus enlargements of the diagrams.

Copyrighted material

Now IN YOUR OWN HOME *Learn* RADIO ELECTRONICS *The Practical* "HOME-TESTED" *Modern* "A-B-C" *Way*



YOU USE ALL OF THESE RADIO PARTS TO BUILD AND OPERATE **7** DIFFERENT RADIO RECEIVING CIRCUITS

INCLUDING:

1. Simple Receiver
2. Two Tube Receiver
3. Tuned Radio-Frequency Receiver
4. Short Wave Receiver
5. Aviation Band Receiver
6. 4-Tube Superheterodyne
7. 5-Tube Superheterodyne with Magic Tuning Eye

• • • PLUS SCORES OF OTHER FASCINATING, INSTRUCTIVE RADIO-ELECTRONIC EXPERIMENTS

WITH THE HELP OF

A EIGHT Big Kits of Actual "Learn-by-Doing" Radio Parts and Assemblies with which you make 133 fascinating SHOP METHOD EXPERIMENTS in your own home! Imagine building 7 different Radio Receivers that operate!

B A 16 mm Home Movie Projector and Twelve Reels of "Learn-by-Seeing" Home Movie Films . . . for picture-clear, fast understanding of Radio Fundamentals!

C Modern, well-illustrated, Loose-leaf Lessons, prepared in clear, simple, understandable language . . . to guide you throughout your training!

THEN GET THE HELP OF OUR EFFECTIVE EMPLOYMENT SERVICE

NO PREVIOUS RADIO OR ELECTRICAL EXPERIENCE NECESSARY

DeForest's Training, Inc. provides *every major home study aid* to help you learn Radio-Electronics rapidly and thoroughly . . . to give you the *experience* and *confidence* needed for a responsible, Good-Pay Job, or to Start a Business of Your Own! Here is a REAL opportunity field for YOU . . . *when you are a trained Radio-Electronics man!* Just think of the tremendously exciting future ahead of FM Radio, Aviation and Broadcast Radio, Sound Motion Picture Equipment, Servicing and Sales of Radio Equipment, etc. Put *yourself* in this picture . . . See how *you* can benefit from a PRACTICAL training in this fascinating work! Think, too, of the coming possibilities ahead of Radar, Facsimile and Television. Send TODAY for the interesting, opportunity-revealing book, "Victory for You!" See how others probably no more talented or ambitious than you, have advanced in earning power after this training . . . how YOU can do it too! Mail the coupon NOW!

VETERANS!

Big things are happening at DeForest's Training, Inc. for **veterans!** See how you can prepare yourself WITHOUT COST for a GOOD JOB or a BUSINESS OF YOUR OWN in the vast Radio-Electronic opportunity field.

16 MM MOVIE PROJECTOR

YOU USE "LEARN-BY-SEEING" MOVIES

DEFOREST'S TRAINING, INC. INCLUDES INSTRUCTION IN MOTION PICTURE SOUND EQUIPMENT, FM RADIO AND TELEVISION . . . RESIDENTIAL TRAINING IN OUR MODERN CHICAGO LABORATORIES ALSO AVAILABLE—ASK US FOR INFORMATION!

DeFOREST'S TRAINING, INC.
CHICAGO 14, ILLINOIS

E. B. DEVRY, President
DeFOREST'S TRAINING, INC.
2535-41 North Ashland Ave., Dept. PS-E5
Chicago 14, Illinois, U.S.A.

Send FREE "VICTORY FOR YOU!" BOOK, showing how I may make my start in Radio Electronics.

Name_____ Age_____

Address_____ Apt._____

City_____ Zone_____ State_____

☐ If under 16, check here for special information.

☐ If a discharged Veteran of World War II, check here.

Copyrighted material

How to Make YOUR Body Bring You FAME

Instead of SHAME!

This is an actual snapshot taken at the beach.

Will You Let Me Prove I Can Make You a New Man?

I KNOW what it means to have a body that people pity! I was once a skinny, 97-lb. weakling—such a poor specimen that I was constantly self-conscious, embarrassed. But later I discovered the secret that turned me into the holder of the title, "The World's Most Perfectly Developed Man." I'd like to prove that the same system can make a NEW MAN of YOU!

7 DAY TRIAL OFFER

I don't say I can do all this for you in 7 days. But I DO want to prove I can show you enough results in even THAT short time to convince you that my system of "*Dynamic Tension*" will give you the kind of body you have always longed to have!

Do you want powerful shoulders—a fine, deep chest—biceps like iron—arms and legs rippling with strength—a stomach ridged with sinewy muscle—a build to be proud of? Then let me prove that "*Dynamic Tension*" is what you need.

FREE BOOK It costs only a stamp — or a postcard—to mail coupon below. I'll send my new, free book, "Everlasting Health and Strength." It tells about my "*Dynamic Tension*" method; shows, from actual photos, how I have developed my pupils — explains about my 7 DAY TRIAL OFFER. Charles Atlas, Dept. 1E, 115 East 23rd St., New York 10, N.Y.

Mail Coupon Now for FREE Book

CHARLES ATLAS, Dept. 1E,
115 East 23rd Street, New York 10, N. Y.

I want the proof that "*DYNAMIC TENSION*" will help make a new man of me—give me a healthy, husky body and big muscle development. Send me your free book, "Everlasting Health and Strength."

Name ..... Age .....
(Please print or write plainly)

Address .....

City ..... State .....

Famous BAILEY DIESEL SCHOOLS

Now Accepting CIVILIAN STUDENTS!

Bailey has a national reputation for "finest training methods." Bailey teaches you fundamentals, plus the practical application of theory in plenty of actual shop work. Bailey is *approved* by industry. Bailey graduates get the jobs!

Civilian men and boys over 17 who are ambitious to get ahead will act now. Send for FREE catalog. No salesman will call.

BAILEY TECHNICAL SCHOOLS
1656 So. Grand Blvd., St. Louis, Mo.

Easy Self-Instruction In All 25 Branches Of

MATHEMATICS

Brought To You By Experts From Leading Colleges

in the 4 volumes of the PRACTICAL MATHEMATICS LIBRARY. Helps you qualify for the better jobs in industry. 1300 pages, 600 illustrations. Sent for free examination. Only $2.00 down, $2.00 a month; total $9.80 plus postage. (Cash price $9.50, postage free. Money-back guarantee.) 160-page 6-Place Logarithm book free with order. **National Educational Alliance, Inc., Dept. 805, 37 West 47th St., New York 19, N. Y.**

PHOTOGRAPHY

STUDY AT HOME. Photography offers leisure time enjoyment and well-paid, fascinating career. Ever-increasing opportunities! Success-proved N.Y.I. training qualifies you at home. Also resident courses. Details FREE!

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. 5, 10 West 33 St., New York 1, N. Y., (38th Year)

Be an ARTIST!

Learn at home in your spare time

Prepare now for a fascinating and profitable Art career. Our practical method has trained men and women since 1914. COMMERCIAL ART, CARTOONING, and DESIGNING all in one complete course. Trained Artists are capable of earning $60, $75 or more a week. No previous Art experience necessary. We teach you step-by-step. FREE BOOK, "Art for Pleasure and Profit" describes course, commercial opportunities, and TWO ART OUTFITS included with training.

VETERANS! Course G.I. Approved.

FREE BOOK gives details!

Washington School of Art, Studio 135M
1115—15th St., N.W., Washington 5, D. C.

Please send me full information and your Free Book. "Art for Pleasure and Profit."

Name ..... AGE .....

Street .....

City ..... Zone .... State .....

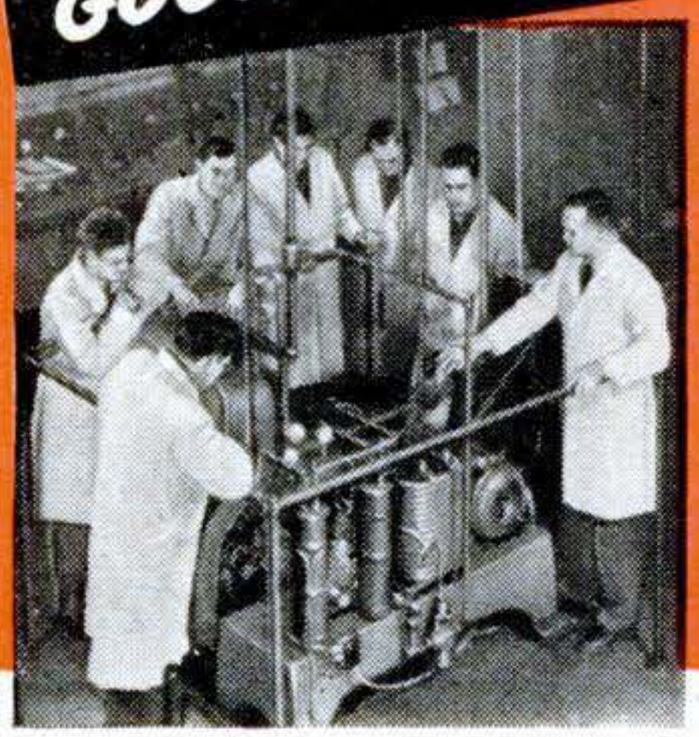
☐ I am entitled to training under the G. I. bill.

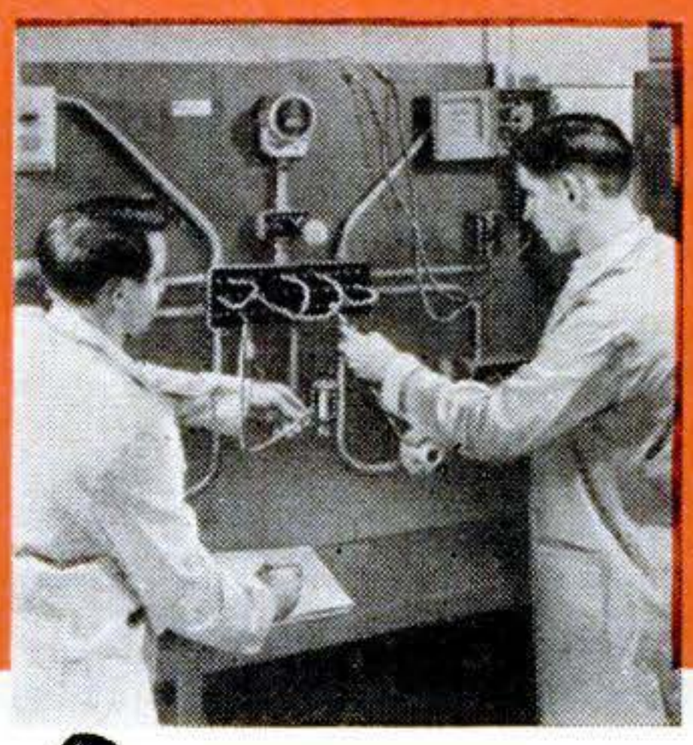
Copyrighted material

AMERICA'S FOREMOST SCHOOL OF PRACTICAL TRAINING

IS READY TO PREPARE YOU NOW FOR A GOOD JOB IN—

REFRIGERATION AIR CONDITIONING





TRAIN BOTH AT HOME

AND IN ITI'S BIG SHOPS

What's YOUR ambition? Better pay? An interesting job? Your own business? They're all waiting for you **right now** in Refrigeration and Air Conditioning! The tremendous growth of this great industry is almost unbelievable .. and a growing industry needs trained men. If you're mechanically inclined and like to work with tools . . . Refrigeration and Air Conditioning offers you a bright future. In a few short months Industrial Training Institute . . . America's foremost school of practical training—will prepare you to step into a good paying job with plenty of opportunity to advance.

Home and Shop Training

Under the famous ITI 2-Way Plan you get all the fundamentals of Refrigeration and Air Conditioning at home . . . during spare hours. Keep your present job and income while training. Upon completion of your ITI Home Study you come to Chicago, with transportation paid, for a FULL FOUR WEEKS of practical training in our great shops. You actually work with the same kind of equipment you'll meet on the job.

WARM AIR HEATING INCLUDED

ITI Training is best for you because it's really complete . . . **including the huge field of Warm Air Heating to boost your income.** You learn *both* the "how" and the "why" of servicing, repairing, installing and rebuilding both home and commercial equipment. The ITI graduate is qualified to handle any practical job in the industry.

AN OLD ESTABLISHED SCHOOL

Established in 1916, ITI has given training to over 400,000 men. Thousands of its graduates hold key jobs at top income. This great school, occupying five large buildings with over $500,000.00 invested in training equipment and facilities, offers you the training you need for a flying start to success.

ITI TRAINING 100% PRACTICAL

You need no special schooling or experience. ITI training is easy to grasp, simple, 100% practical. No dull mathematics or complicated theory. ITI lesson Work Sheets are written in simple English. **After graduation, ITI's Job Placement Help Department will help you find the job you want.**

GET THE FACTS NOW—*Mail Coupon!*

Find out what's ahead for you in Refrigeration and Air Conditioning. See how simple it is to study at home and prepare yourself for a fine job with a splendid future. It's all in our fascinating, illustrated FREE book, "Your Future in Refrigeration and Air Conditioning." Just fill out and mail the coupon for your FREE copy. Take this first step today.

VETERANS:

ITI Residence Training is fully approved under the G.I. Bill.

ITI also TRAINS AMBITIOUS MEN for GOOD JOBS in . . .

- **Electricity and Industrial Electronics**
- **Machine Drafting & Design**
- **Precision Instruments**

INDUSTRIAL TRAINING INSTITUTE

Formerly the L. L. Cooke School of Electricity & Refrigeration & Air Conditioning Institute

Dept. E-2, 2150 LAWRENCE AVE., CHICAGO 25, ILL.

MAIL COUPON TODAY FOR

FREE BOOK!

Mr. C. H. Smith, President,
INDUSTRIAL TRAINING INSTITUTE
2150 Lawrence Ave.,
Dept. E-2, Chicago 25, Ill.

Please send me FREE the ITI book, "Your Future in Refrigeration and Air Conditioning" and information about the opportunities for trained men in this fast growing field. I understand I'm under no obligation.

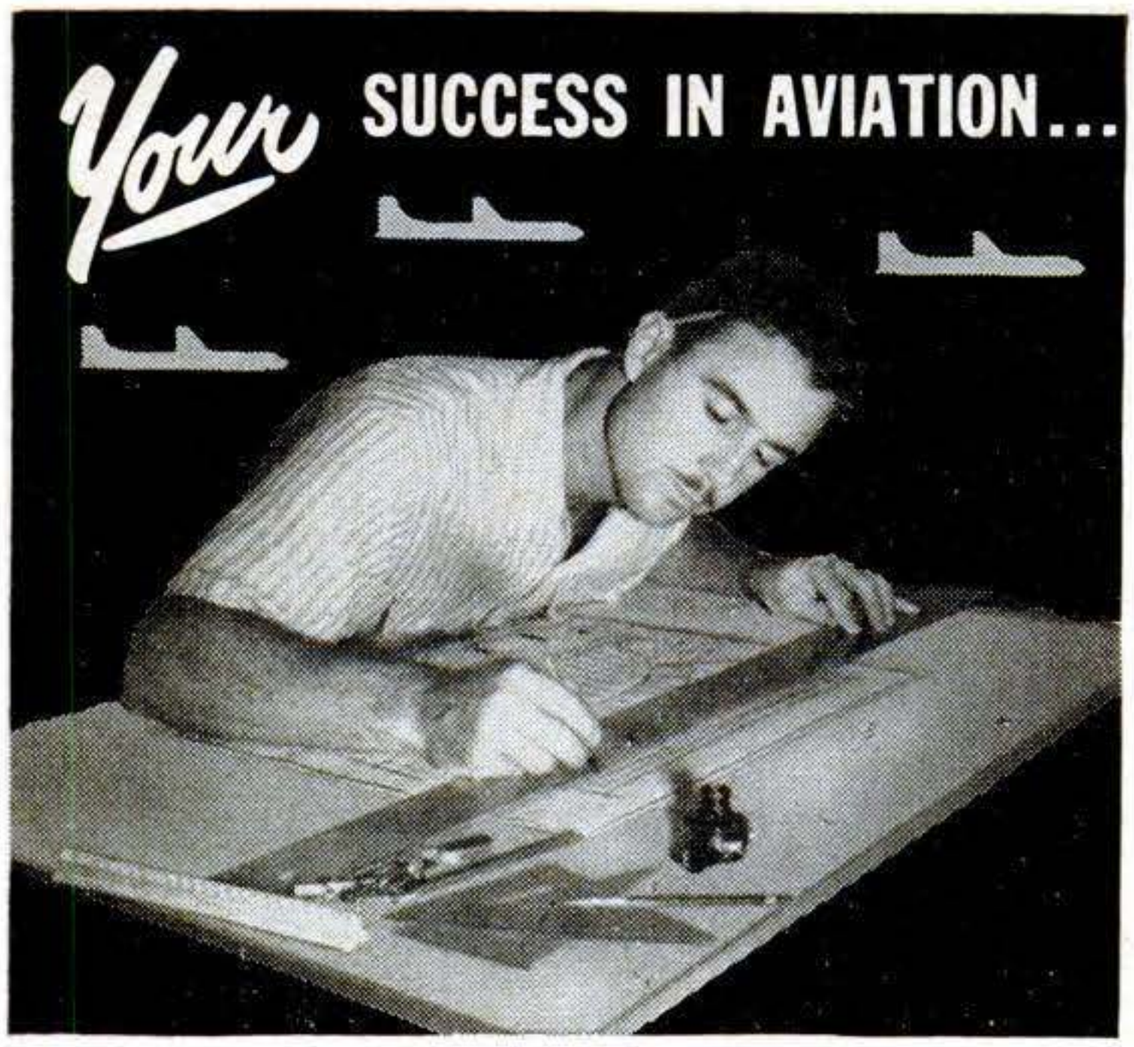
NAME_____ AGE_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

ARE YOU A VETERAN?_____

Copyrighted material



Embry-Riddle trained

DESIGN ENGINEERS

Rate Best Jobs...Everywhere

Embry-Riddle courses in design engineering lead to your success in aviation as a flight, project or maintenance engineer and to all types of drafting and design. In 26 years Embry-Riddle has trained almost 40,000 civilian and military students . . . and has always found good jobs for its technical school graduates.

Aviation needs thousands of skilled men. Embry-Riddle's expert staff trains you in fully equipped classrooms and laboratories for all standard ground and flight positions including radio and electronics. Features include daily work on live aircraft.

Excellent dormitories provide bachelor housing at Embry-Riddle. Live, work and play in beautiful Miami, where your training in aviation is complete with 365 flying days a year . . . and modern airliners fill the sky. Send coupon today for full information at no obligation to you!

Authorized G. I. Training

Embry Riddle International SCHOOL OF AVIATION MIAMI 30, FLORIDA

Dean of Enrollments — Dept. 61 Embry Riddle School of Aviation
PLEASE PRINT Miami 30, Florida

Name.....*Age*.....

Address.....

City.....*State*.....

I am interested in: Airplane and Engine Mechanics (A & E) [ ] Design Engineering & Maintenance [ ] Aeronautical Drafting & Design [ ] Flying Mechanic [ ] Airplane Operation & Maintenance [ ] Flight Training ☐ Radio and Electronics [ ]

Check One: Veteran . . . ☐ Non Veteran ☐

TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

STUDY AT HOME

With An Educational Institution

Men with specialized training win higher positions, insure larger earnings, and are bigger successes in business and public life. Opportunities NOW greater than ever before. Send for our Catalog.

ARTS and SCIENCES

Courses in Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Plastics; Geology; Political Science; Theology; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture.

ENGINEERING

Courses in Electrical, Civil, Mechanical, Drafting, Architectural, Steam, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Chemical, Diesel, Automobile, Refrigeration, and Air Conditioning Engineering.

LAW

Complete Professional Law Course includes 18 Hornbrook Series college grade textbooks. Courses also in Commercial Law, Patent Law and Medical Jurisprudence.

McKinley-Roosevelt Incorporated, 4610-AB, Sheridan Rd. Chicago 40, Ill.

SHORTHAND in 6 Weeks at Home

Famous Speedwriting system. No signs; no symbols; no machines; uses ABC's. Easy to learn; easy to write and transcribe. Fast preparation for a job. Surprisingly low cost. 100,000 taught by mail. Used in leading offices and Civil Service. Write for free booklet.

SPEEDWRITING, Dept. 2605-8 55 West 42 St., N. Y. 18

ENORMOUS PROFITS CASTING AT HOME

Write today for FREE FACTS

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start **NOW—NO EXPERIENCE, LITTLE CAPITAL** needed. Earn **GREAT PROFITS** with **X.L. RUBBER MOLDS.** X.L. Rubber. Pts. **$2.00;** Qts. **$3.50;** Gallons **$8.95;** Models and enough rubber for 3 molds . . . **$1.00**—Foreign **$1.50.**

PLASTIC ARTS STUDIO Route 2, Dept. 3 MUNCIE, IND.

LEARN TO WRITE *a Good Hand!*

FOR BUSINESS AND SOCIAL SUCCESS!

Improve your handwriting at home quickly with my new instruction books just off the press. Master all the secrets of better penmanship. Simple and easy, fully illustrated, highly endorsed. Begin today. Write for: ☐ **New Free Book,** "How to Become a Good Penman", or check books wanted, $1.00 each. ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Engrossing Alphabets ☐ Bird and Design Flourishing ☐ Complete Set $4.50 ☐ Enclose 10c for your name beautifully written and shading penpoint.

S. A. Ziller, President, TAMBLYN SCHOOL OF PENMANSHIP
439 Ridge Bldg. *In Business Over 52 Years* **Kansas City, Mo., U.S.A.**

LEARN MEAT CUTTING At Home—In Spare Time

Get into the vital meat industry. Concise, practical Home Training based on 25 years proven instruction methods used at National's famous resident school. Prepares you for bigger pay as Meat Cutter, supervision, market manager or more money in your own store. Go as rapidly as your spare time permits. Diploma. Start NOW to turn your spare hours into money. Send for FREE bulletin today. No obligation.

National School of Meat Cutting Inc., Div. O-66, Toledo 4, Ohio

TELEVISION and F-M RECEIVER SERVICING, *by Milton S. Kiver*

Here at last is a practical up-to-the-minute book containing specific directions for trouble-shooting and repairing F-M and Television Receivers. Illustrations, photographs, schematic diagrams. Send today for FREE EXAMINATION copy. After 10 days you may return the book or send $3.25 in full payment to:

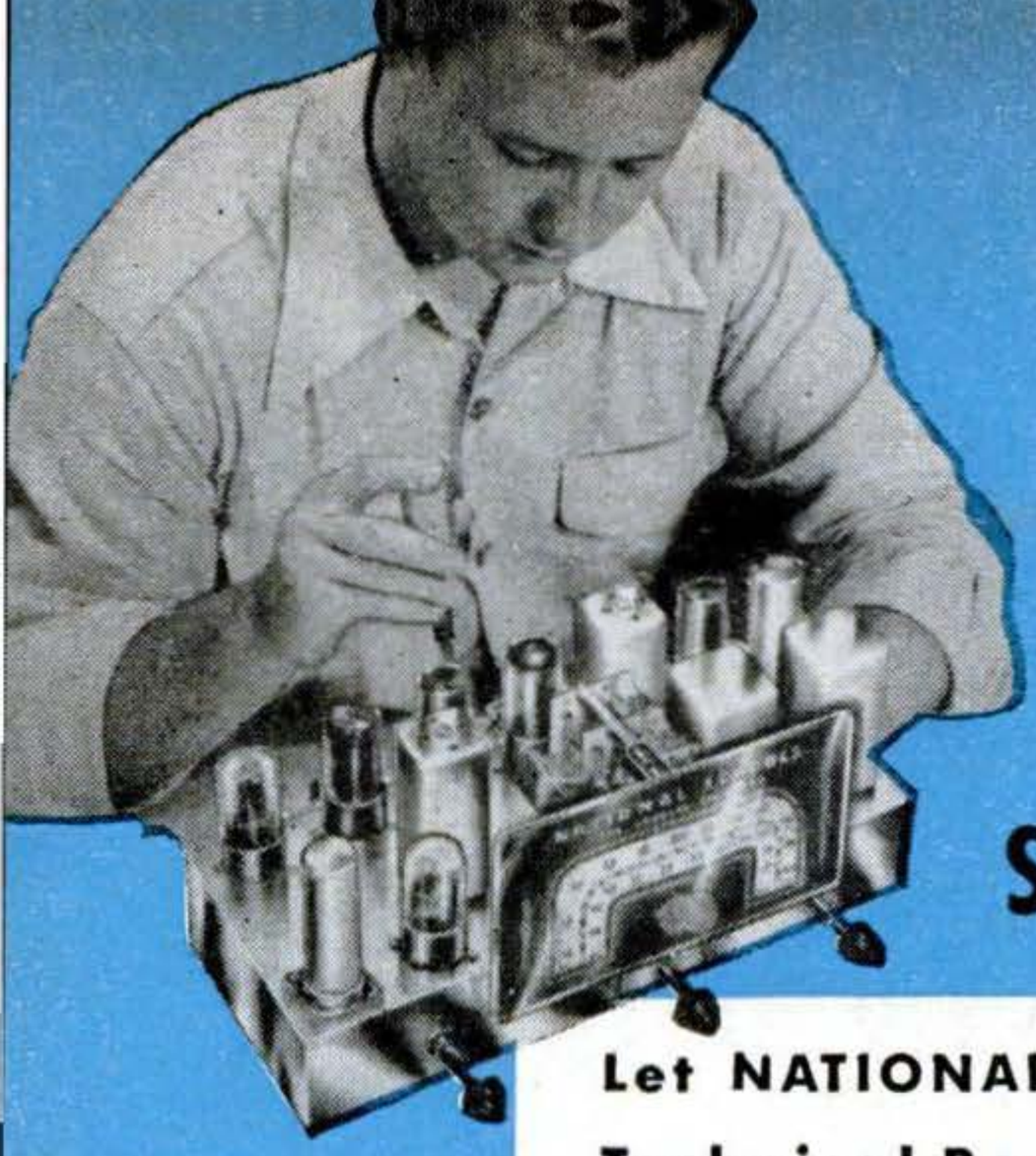
D. VAN NOSTRAND COMPANY, Inc., 250 Fourth Ave., New York 3, N. Y.

Name.....

Address.....

City.....State..... Pop. Sci.—5/48

Copyrighted material

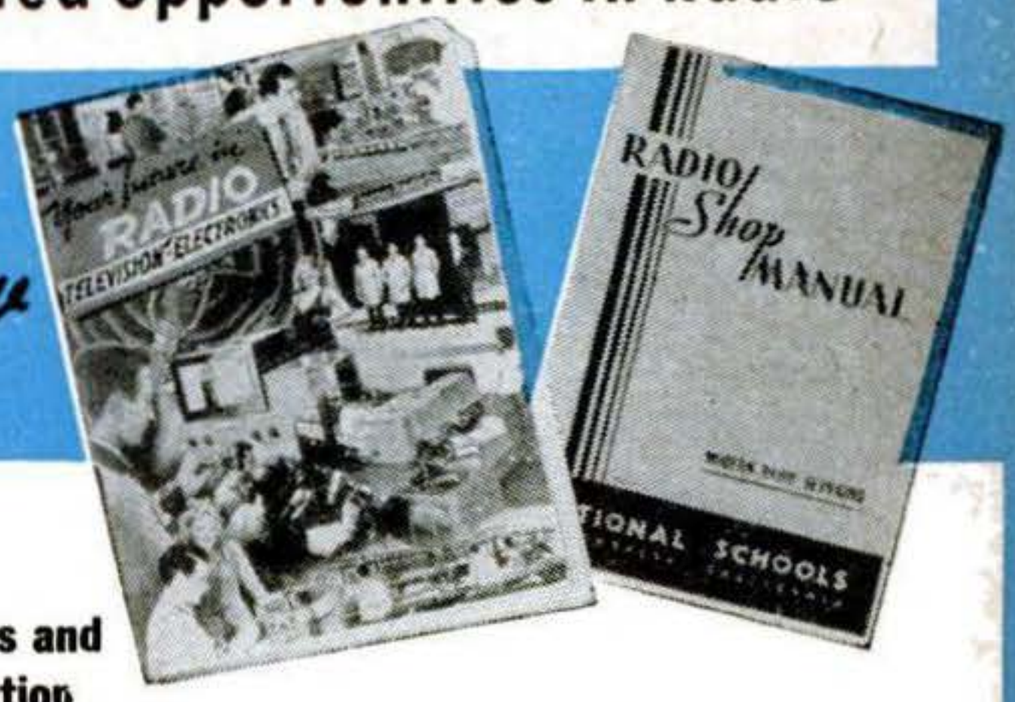


You receive all parts, including tubes, for building this fine, modern Superheterodyne Receiver. This and other valuable standard equipment becomes your property.

Learn RADIO TELEVISION, ELECTRONICS *by* SHOP METHOD HOME TRAINING

Let NATIONAL SCHOOLS, of Los Angeles, a practical Technical Resident Trade School for over 40 years, train you for today's unlimited opportunities in Radio

these two **FREE** *books will tell you how*



GOOD JOBS AWAIT THE TRAINED RADIO TECHNICIAN

You are needed in the great, modern Radio, Television and Electronics industry! Trained Radio technicians are in constant and growing demand at excellent pay—in Broadcasting, Communications, Television, Radar, Research Laboratories, Home Radio Service, etc. National Schools Master Shop Method Home Study Course, with newly added lessons and equipment, can train you in your spare time, **right in your own home,** for these exciting opportunities. Our method has been proved by the remarkable success of National Schools-trained men all over the world.

You Learn by Building Equipment with Standard Radio Parts We Send You

Your National Schools Course includes not only basic theory, but **practical** training as well—**you learn by doing.** We send you complete standard equipment of professional quality for building various experimental and test units. You advance step by step until you are able to build the modern superheterodyne receiver shown above, which is yours to keep and enjoy. You perform more than 100 experiments—build many types of circuits, signal generator, low power radio transmitter, audio oscillator, and other units. The Free Books shown above tell you more about it—send for them today!

Lessons and Instruction Material Are Up-to-date, Practical, Interesting

National Schools Master Shop Method Home Training gives you basic and advanced instruction in all phases of Radio, Television and Electronics. Each lesson is made easy to understand by numerous illustrations and diagrams. All instruction material has been developed and tested in our own shops and laboratories, under the supervision of our own engineers and instructors. A free sample lesson is yours upon request—use the coupon below.

Here's Just a Few of the Interesting Facts you Learn with the

FREE MANUAL

1. Routine for diagnosing Radio Troubles.
2. Preliminary inspection of Receivers.
3. How to Test and Measure Voltages.
4. How to Test Speaker in Audio Stages.
5. How to Trace the Circuit and Prepare Skeleton Diagram.
6. Complete Reference Table for Quickly Locating Receiver Troubles.

Both HOME STUDY and RESIDENT TRAINING OFFERED.

NOW! NEW PROFESSIONAL MULTITESTER INCLUDED

This versatile testing instrument is portable and complete with test leads and batteries. Simple to operate, accurate and dependable. You will be able to quickly locate trouble and adjust the most delicate circuits. You can use the Multitester at home or on service calls. It is designed to measure AC and DC volts, current, resistance and decibels. You will be proud to own and use this valuable professional instrument.

GET THE DETAILS—SEND THE COUPON ➡

G. I. APPROVED

NATIONAL SCHOOLS

LOS ANGELES 37, CALIFORNIA EST. 1905

MAIL OPPORTUNITY COUPON FOR QUICK ACTION

National Schools, Dept. PS-5
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelo or paste on pen postcard.)

Mail me FREE the books mentioned in your ad includi a sample lesson of your course. I understand no salesm will call on me.

NAME.....AGE.....

ADDRESS.....

CITY.....ZONE.....STATE.....

☐ Check here if veteran of World War II
Approved for veterans

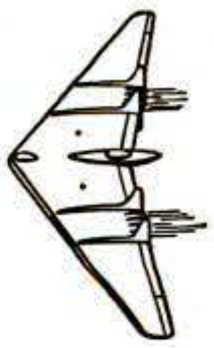
Copyrighted material

Make this YOUR DESIGN for SECURITY and SUCCESS

The aeronautical engineer designs aircraft for specific performance. YOU can design *your career, your future,* for security and success. Choose the field that is young, with years of growth and tremendous size ahead. ***That's Aviation.*** Choose a profession vital to that field—***Aeronautical Engineering or Aviation Maintenance.***

In either of these two ***key divisions*** of Aviation your future is ***designed*** for interesting duties, good earnings from the start, rapid advancement, earlier independence and security, gratifying personal achievement.

Train at Northrop



This design for your career in Aviation is a ***practical design...*** for you are trained by a division of the company that developed the Flying Wings and other famous aircraft ... an organization that is itself a major employer of engineers and mechanics, and knows ***how*** and ***what*** you must learn.

In only 2 years (less time, with advanced standing) you can complete the ***Northrop Aeronautical Engineering course...*** a technical institute curriculum accredited by the Engineers' Council for Professional Development. The ***Aircraft & Engine Mechanics course*** (approved by Civil Aeronautics Administration) requires only 1 year. Get complete information on the broad opportunities open to you with Northrop training —send coupon now.

APPROVED FOR VETERANS

NORTHROP
Aeronautical Institute
Division of Northrop Aircraft, Inc.
1525 East Broadway
Hawthorne, Los Angeles County
California

Please send me the Institute catalog and complete information, including starting dates of classes I am interested in ☐ Aeronautical Engineering
☐ Aircraft and Aircraft Engine Mechanics (A&E)

Name

Address Age

City Zone State

Check one: ☐ Veteran ☐ In Service ☐ Civilian

Practical Shop Training
in
REFRIGERATION
AIR CONDITIONING
and/or
PRACTICAL ELECTRICITY
MAJOR APPLIANCES
Service, Maintenance, Installation

Train in the Magic City of the South

Write for Details
COMMERCIAL TRADES INSTITUTE
202 SO. 20TH ST., BIRMINGHAM, ALA.
Veterans Inquire About GI Training

ENGINEERING DEGREE IN 27 MONTHS

INDIANA TECHNICAL COLLEGE

Aeronautical, Chemical, Civil, Electrical, Mechanical, and Radio Engineering (inc. television). Drafting, 1-yr. Gov't approved for G.I.'s. Low rate. Earn board. Large industrial center. Students from 48 states, 18 countries. Demand for graduates. Enter June, Sept., Dec., March. Catalog.

658 E. Washington Blvd., Ft. Wayne 2, Ind.

The American Institute of Specialized Watch Repair
270-276 East Building GRAND RAPIDS 6, MICHIGAN
A Fully Accredited School

You can learn this highly fascinating and profitable trade through this Institute, either at home by correspondence or at the resident school.
Earn While You Learn

Write for Free Circular

Learn
WATCH REPAIRING

LEARN MONEY-MAKING CARTOONING

IN SPARE TIME — by Easy Picture Chart Method
Same Simplified Method that has helped train creators of "Terry & Pirates," "Freckles," "Out Our Way," "Winnie Winkle," "Reg'lar Fellers," "Strange As It Seems," "The Neighbors," and many others. Earn while learning. Send 10c for Picture Chart (to test your ability). Samples of successful students, and full details. (State age.)

The Landon School, 4825 Cleveland Transit Bldg., Cleveland, O.

Write Like This!

AMAZING DISCOVERY! Corrects poor penmanship in few days —big improvement in three hours. **TEN DAYS TRIAL ALLOWED.** Write C. Ozment, 35-D, St. Louis, Mo. IMMEDIATELY.

New Designs in
FRANZITE GRIPS

Modernize Your Gun! Improve Your Score!
Most durable grips made. Positively unbreakable! For Colt, Smith & Wesson, Hi-Standard, Ortgies, Luger & Mausers in a wide choice of beautiful designs in ivory, pearl, walnut, onyx, etc. Low prices. FREE CATALOG. Dealers Wanted.

SPORTS, INC., (Mfrs.) 5501 Broadway, Dept. S-5, Chicago 40, Ill.

Free Book

RAISE HAMSTERS

The new wonder animals from Syria. Often called Toy Bears. Delightful pets. Everyone wants them. Laboratories need thousands. Clean, odorless. Raise anywhere. A profitable and interesting hobby or business. We furnish breeders and instructions. Write today for free book.

GULF HAMSTERY, 1540 BASIL ST., MOBILE, ALA.

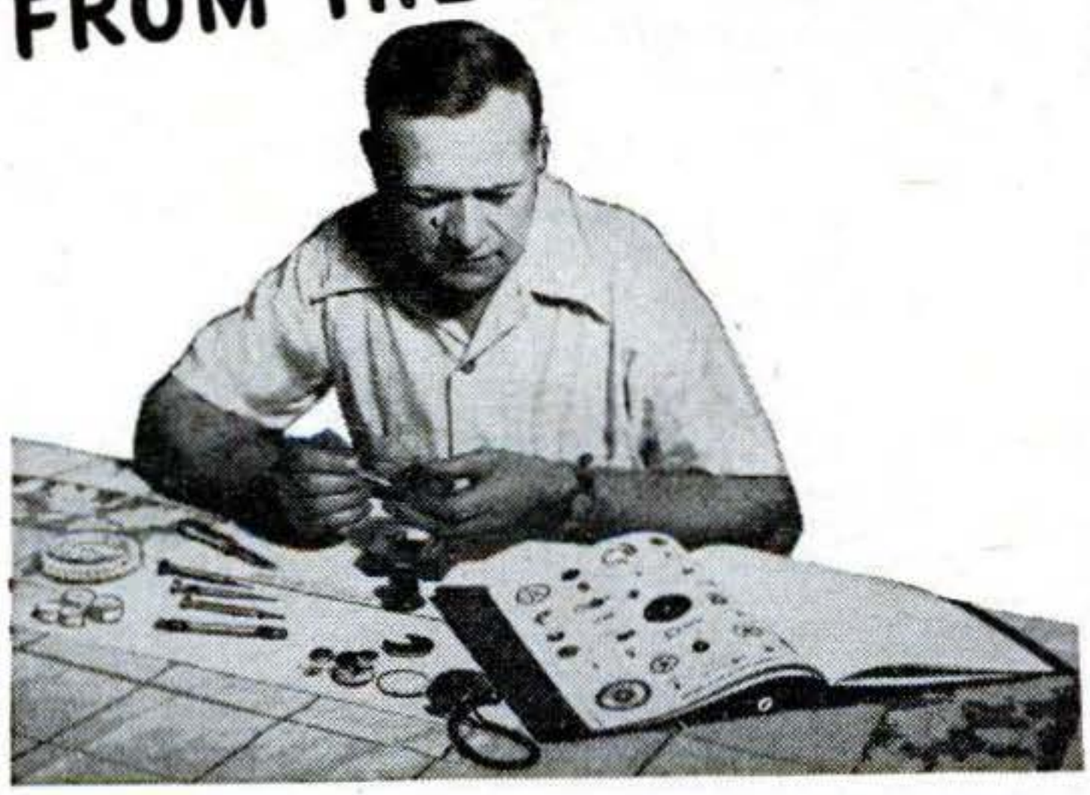
Copyrighted material

NOW... YOU CAN LEARN

WATCH REPAIRING

In Your Spare Time At Home

FROM THE LARGEST APPROVED SCHOOL OF ITS KIND



HOME TRAINING WITH TOOLS

Lets You EARN While You Learn
Enroll Now For

BIG PAY PROFESSIONAL FUTURE

IN AN UNCROWDED FIELD

• The Illinois School of Watch Repairing offers you an opportunity NOW . . . to learn the fascinating art of WATCH REPAIRING in your spare time at home . . . and thus insure your future earning power. No loss from your present work! No previous mechanical experience needed! As an expert Watchmaker you can enter an uncrowded field with big pay possibilities unlimited.

Your Safeguard is . . . a Specialized Education

Actual Watch Repairing With Each Lesson

Our spare time Home Training thoroughly instructs you in all the rudiments of practical Watch Repairing. Enables you to master the complete 10-Lesson Course quickly, easily—earning as you learn with actual repair jobs—with a Diploma issued upon your graduation. We furnish all necessary tools and watch and teach you actual watch repairing with the use of these tools. You learn how to take any watch apart and put it together in fine working order—to make part replacements—to clean and expertly repair any watch. Ours is a proven course. It has taught and is teaching expert watch repairing. It can do the same for you.

Testimonials From Our Students

"I have repaired 63 watches and have more than paid for Course". C. Fuller, Texas. "Every promise made by the School to me has been faithfully performed". S. A. McCulla, Calif. "Your lessons are the most complete and easy to understand that I have ever studied". C. L. Doud, Oreg. . . . Many more letters from our enthusiastic students in our files.

TRAINED WATCHMAKERS
Now In Demand
BE YOUR OWN BOSS

FREE WATCH *and* WORKING TOOLS
included as part of your course

ILLINOIS SCHOOL OF WATCH REPAIRING
2870 ELSTON AVENUE
CHICAGO 18, ILLINOIS

MAIL COUPON NOW FOR FREE FACTS

ILLINOIS SCHOOL OF WATCH REPAIRING
2870-CR Elston Ave., Chicago 18, Ill.
Kindly send me FREE LITERATURE on your Spare Time Home Training Course in WATCH REPAIRING. I understand no salesman will call on me.

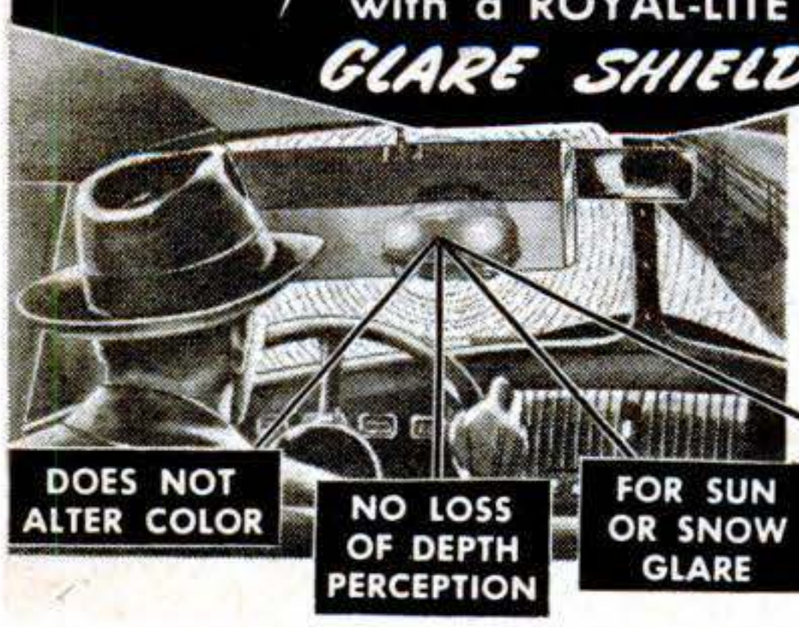
Name.....

Address.....

City.....Zone.....State.....

Copyrighted material

REDUCE GLARE DAY OR NITE with a ROYAL-LITE GLARE SHIELD



Reduce Glare *without impairing vision*

DRIVE WITH GREATER EASE NIGHT AND DAY!
Reduce eye strain caused by headlights, sun, haze, fog, rain or snow, with the new Royal-lite glare shield.

DEALERS WANTED

Optometrically correct
No loss of depth perception
Shows natural colors
Adjustable for height
Easy to install

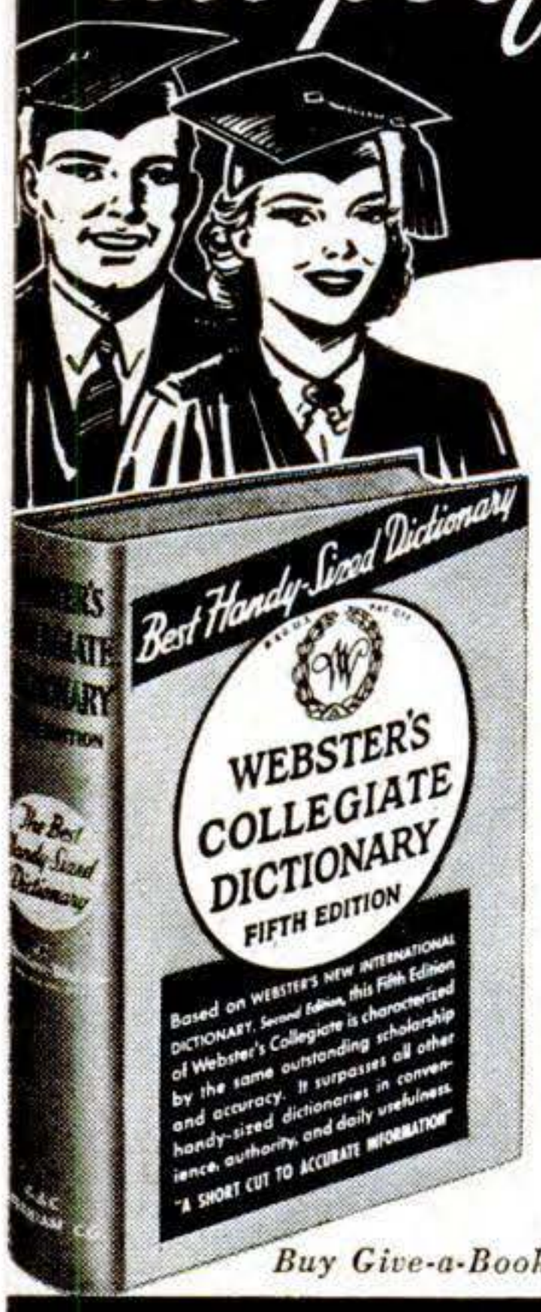
Write for additional information.

ROYAL-LITE SENIOR 6" x 14"..... $4.95
ROYAL-LITE JUNIOR 4" x 8"..... $1.95

Order direct—TODAY—Postage prepaid when remittance accompanies order.

ROYAL-LITE SALES CORPORATION
Suite 211, Dept. S, 1007 S. Grand Ave., Los Angeles 15, Calif.

the perfect gift FOR THE NEW GRADUATE



The Best Handy-Sized Dictionary

Webster's Collegiate is based on "The Supreme Authority"—Webster's New International Dictionary, *Second Edition*. Defines all words most commonly used. Over 110,000 entries; 1,300 pages; thumb-notch index. Gift bindings in cloth, fabrikoid, and leather, from $5 to $10. At your bookseller or stationer.

G. & C. MERRIAM CO.
Springfield 2, Mass.

Buy Give-a-Book Certificates of Your Bookseller

WEBSTER'S COLLEGIATE
A Merriam-Webster

Have an **OFFICE OF YOUR OWN!**

LEARN NEW PROFITABLE PROFESSION
At Home in 60 Days, Men & Women, 18 to 70!

Be Your Own Boss and the Boss of Others. Be Respected. Meet Interesting People.

Earnings of men and women in this profession run as high as $5,000-$15,000 yearly. Others make good money in spare time. Little money needed to start. A business where your earnings begin sooner. Easy to learn. No selling or goods to buy. No experience necessary. A depression-proof business. A course of action to guide you step by step as you earn. All 53 lessons sent at once to use as operating manuals. Easy terms. Diploma. Money-back agreement. Write for FREE BULLETIN.

FRANKLIN CREDIT SCHOOL
Dept. 71-E ROANOKE 7, VIRGINIA

BY MAIL in *Easy Lessons*

LAW FREE BOOK

Write today for FREE 48-page book, **"THE LAW-TRAINED MAN,"** which shows how to learn law easily in spare time at home through the Blackstone course prepared by 60 well-known law authorities. We furnish all material including 18-volume Modern American Law library. Many successful attorneys among our graduates. LL.B. degree. Moderate cost; easy terms; Money-Back Agreement.

BLACKSTONE COLLEGE OF LAW
225 N. Michigan Ave., Dept. 125, Chicago 1, Ill.
A Correspondence Institution Founded in 1890

Learn Profitable Profession in 90 days at Home

MEN AND WOMEN. 18 TO 50—Many Swedish Massage graduates make $50, $75 or even more per week. Large full time incomes from doctors, hospitals, sanatoriums, clubs or private practice. Others make good money in spare time. You can win independence and prepare for future security by training at home and qualifying for Diploma. Anatomy Charts and 32-page Illustrated Book FREE—Now! **The College of Swedish Massage, Dept. 870E, 100 E. Ohio St., Chicago 11, Ill.**

SEND FOR THIS FREE!

Make money. Know how to break and train horses. *Write today for this book FREE*, together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ) *Do it today—now.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 585 Pleasant Hill, Ohio

Learn **MECHANICAL DENTISTRY**

To make Crowns, Plates, Bridgework, etc., for Dentists. Easy practical way to learn mechanical dentistry at home in spare time. FULL EQUIPMENT OF TOOLS AND MATERIALS INCLUDED WITH COURSE. Low tuition. Easy terms. Write for FREE BOOK about this money making profession that is not affected by the machine age.

McCARRIE SCHOOL of Mechanical Dentistry, 207 N. Broad St., Dept. 874, Philadelphia, Pa.

Start a NEW BUSINESS Or Add to Your Present Repair Business

Sharpen Dull Pipe Wrenches
Pipe Taps & Dies
"Gum" Circular Saws

Pat. applied for

Write for information.

J. C. MOORE INDUSTRIES P.O. Drawer 276 FREDONIA, PA.

NEW **STOP LIGHT**

Auto FLASHER

FOR FAST, SNAPPY DRIVERS

Makes your Stoplight shout. Flashes 115 times a minute when footbrake is applied. Automatic. Approved by Safety Engineers. Used by Fire and Police Depts. If your dealer can't supply send check or M.O. for $3.00. We pay postage. FREE booklet MONEY SAVING "Motoring Hints" with each order. Dealers and agents wanted.

MACCHI AND COMPANY
927 Larkin St., Dept. S58, San Francisco 9, Calif.

Copyrighted material

These Men are Learning

ELECTRICITY ON REAL EQUIPMENT in the GREAT SHOPS of COYNE

Why Spend Years Preparing for a Good Job? Train Quickly at COYNE—Be Making Real Money While Others are Still Puttering Along!

B.W. COOKE

Yes, you can get ready for Good Pay—a Big Future in ELECTRICITY—by coming to COYNE in Chicago to train on actual equipment! Here you work on real motors, armatures, switchboards — do actual wiring and trouble-shooting — get the "all around" training you need.

Not a "Home-Study" Course

We do not teach by mail. All training is given in our Great Shops, plus necessary theory. Expert instructors guide you. No advanced education or previous experience needed.

EARN WHILE LEARNING

If you need part-time work to help out with living expenses while at **Coyne**, we'll help you get it. Don't be held back by lack of money.

Electrical Refrigeration Included

Added training now included in great new field of Electric Refrigeration—Industrial Electronics also included. Both mean added opportunities.

GI Approved—Finance Plan for Non-Vets

COYNE is authorized to train men under the G.I. Bill. Non-veterans may enroll now, pay most of tuition after graduation. Whatever your problem, COYNE can help you! Mail the coupon now.

GET THE FACTS!

BIG FREE BOOK tells all about your future in Electricity and how you can get ready in a few short weeks at COYNE. Dozens of pictures. Rush coupon today!

PREPARE FOR PERMANENT JOBS LIKE THESE

Light and Power Wiring
Power Plant Work
Armature Winding
Substation Operator
Maintenance Electrician
Electrical Testing
Signal Maintenance
Industrial Electronics
Electric Refrigeration
and many others
Our Employment Bureau for graduates gives FREE Lifetime Job Service.

FREE BOOK

B. W. COOKE, Pres.
COYNE ELECTRICAL
AND RADIO SCHOOL, Dept. 58-73
500 S. Paulina St., Chicago, 12, Ill.

Send me your big FREE BOOK on ELECTRICITY and tell me all about your training offer. This does not obligate me in any way and **no salesman will call on me.**

NAME.....

ADDRESS.....

CITY.....STATE.....

COYNE ELECTRICAL AND RADIO SCHOOL

B. W. COOKE, Pres.

500 S. Paulina St., Dept. 58-73, Chicago 12

This modern fireproof building is occupied entirely by COYNE. Located in Chicago, the Electrical Center of the World.

FOUNDED 1899

MAIL NOW

Copyrighted material

WAR SURPLUS OPTICAL BARGAINS

ASSEMBLE YOUR OWN BINOCULARS!

Save More Than 1/2 Regular Cost

GOVERNMENT'S 7x50 BINOCULARS

COMPLETE OPTICS!
COMPLETE METAL PARTS!
WE SUPPLY
FULL INSTRUCTIONS

METAL PARTS—Set includes all Metal Parts—completely finished—for assembly of 7 X 50 Binoculars. No machining required. Bodies have been factory hinged and covered. A sturdy Binocular Carrying Case is optional with each set of Metal Parts.

Stock #842-N $39.40
Postpaid, plus $4.80 for Case—**Total $44.20**

OPTICS—Set includes all Lenses and Prisms you need for assembling 7 X 50 Binoculars. These are in excellent condition—perfect or near-perfect—and have new low reflection coating.

Stock #5102-N . . . . . $25.00 Postpaid

NOTICE! If you buy both Binocular Optics and Binocular Metal Parts, add 20% Federal Excise Tax to above prices.

ARMY'S 6x30 BINOCULARS

COMPLETE OPTICS & METAL PARTS—Model M-13A1, 6 x 30 Binoculars (waterproof model). Everything you need—ready for assembly. When finished will look like a regular factory job costing $102 to $120. The Optics are new, in perfect or near-perfect condition. Have new low reflection coating. Metal Parts are new and perfect, all completely finished. No machining required. Bodies factory hinged and covered. Complete assembly instructions included.

Stock #830-N . . . . . $40.00 Postpaid, plus $8.00 tax—Total—$48.00

TERRIFIC BARGAIN—BUBBLE SEXTANT

These Army Air Forces Bubble Sextants cost Govt. about $125. each. Bargain at our price of $12.50. Wooden carrying case included. Wartime used but COMPLETELY REPAIRED AND COLLIMATED. Return within 10 days for full refund if dissatisfied. Directions for use accompany shipment.

Stock #924-N . . . . . $12.50 Postpaid

Same SEXTANT as above, but BRAND NEW and with Automatic Averaging Device and Illuminated Averaging Disc for nighttime use. Govt. cost $217. Perfect working order guaranteed.

Stock #933-N . . . . . $22.50 Postpaid

6 POWER GALILEAN TELESCOPE—(Commercial Surplus) 28mm dia. Achromatic Objective Lens. Sturdily constructed of Aluminum. 7" long, extends to 9". Complete with carrying case.

Stock #941-N . . . . . $3.00 Postpaid

We have literally millions of war surplus lenses and prisms for sale at bargain prices ranging 10c and up. Write for Catalog "N" — Sent Free!

Order by Stock No. ***Satisfaction Guaranteed***

EDMUND SALVAGE COMPANY

P. O. AUDUBON, NEW JERSEY

HY-SCORE

World's Most Powerful
AIR PISTOL

ACCURATE! FAST! HARD-HITTING!... Expensively made piston-type pistol for use by experts. No pumping. 30½ oz. 10¼" long. Cal .177 or .22. $19.85 for set including Hy-Score Pellets and darts*. Extra ammunition per box of 500 rounds $1.49 for Cal .177, $1.88 for Cal .22.

*When available.

Use HY-SCORE Pellets for best air pistol shooting.

If your dealer cannot supply, write for free booklet, Dept. PS-5
HY-SCORE ARMS CORP., BROOKLYN 1, N. Y.

Be A MASTER PLUMBER

Earn $15 To $50 A Day

DON'T ENVY THE PLUMBER—BE ONE

Every skilled workman will tell you that Plumbers have the best of it. WINTER and SUMMER the Plumber is busy at top wages. No skilled Plumber is ever out of a job—compare his opportunities with any trade, plus the opportunities of having your own shop.
We teach you Plumbing with TOOLS (not books) under Licensed Master PLUMBERS in one of the finest equipped schools in America. We make you a Plumber, every branch is taught thoroughly—Lead Work—Blueprint for plan reading—all other tricks.

LEARN IN 32 WEEKS WITHOUT PREVIOUS EXPERIENCE

If you like to work with tools you owe it to yourself to investigate. No need to ever work as an apprentice. Get free bulletin. Write now! G.I. APPROVED. Our 24th year.

UNIVERSAL PLUMBING SCHOOL
819 HOLMES STREET KANSAS CITY, MO.

CHEMISTRY

LEARN AT HOME... Chemical knowledge is essential for thousands of good jobs in industry, business, science. IPC enables you to master practical chemistry. It's the ONLY home study chemistry course which enables you to learn by performing actual experiments—using chemicals and apparatus supplied with the course—in addition to your IPC textbook studies. Compares with recognized college courses in General Chemistry. Write today for free descriptive booklet.

INSTITUTE OF PRACTICAL CHEMISTRY
2 PROSPECT AVENUE, HAGERSTOWN, MD.

THERE'S MONEY IN CARTOONS!

RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS **at home** that you may SELL! Course contains **26 lessons** and **over 600 illustrations.** All for *Only*.. **$2.85**
Send name and address for free details.

RAYE BURNS SCHOOL, Dept. 8, Box 3583, CLEVELAND, OHIO

CORRESPONDENCE COURSES IN
RADIO and ELECTRICAL ENGINEERING

Tuition **$25**

ELECTRICAL ENGINEERING. Get good grasp of wide electrical field. Modern. Very understandable. Theory made easy.
RADIO ENGINEERING. Extra fine course in radio, public address, photo-electric work. Trains you to be super-service man, real vacuum tube technician. Tuition ONLY $25. either course. Deferred payment plan. Servicemen needed badly.

FREE Write for free copies of school catalogs, student magazines, etc.
LINCOLN ENGINEERING SCHOOL, Box 931-S-113
LINCOLN, NEBR.

ARTISTS MAKE MONEY

Do you like to draw? Send name, address, age and occupation for FREE ART TEST, to find out your ability.

ART INSTRUCTION, INC.
5148 Art Instruction Bldg., Minneapolis 15, Minn.

Learn PHOTOGRAPHY at Home

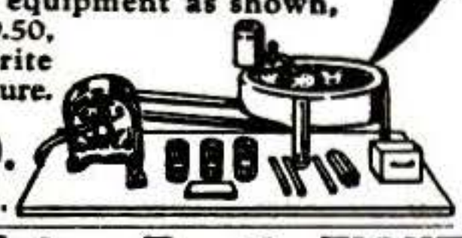
Splendid opportunities. Prepare in spare time. Practical basic training. Long-established school. Send for free book, "Opportunities in Photography." No obligation.

American School of Photography, 1315 S. Michigan Ave., Dept. 1365 Chicago 5, Ill.

---

make your own *Gems* 29.50 F.O.B.

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.



B&I MANUFACTURING CO.
Dept. M — Burlington, Wis.

Fit-Rite makes False Teeth TIGHT

Makes loose dental plates fit snugly and comfortably.
LASTS for MONTHS!

Simply squeeze on dental plate and put it in your mouth. Hardens and becomes part of plate. Money-back guarantee.

FREE Generous package of Dental Plate Cleanser with each order. Send $1.00 or mailed parcel post collect.

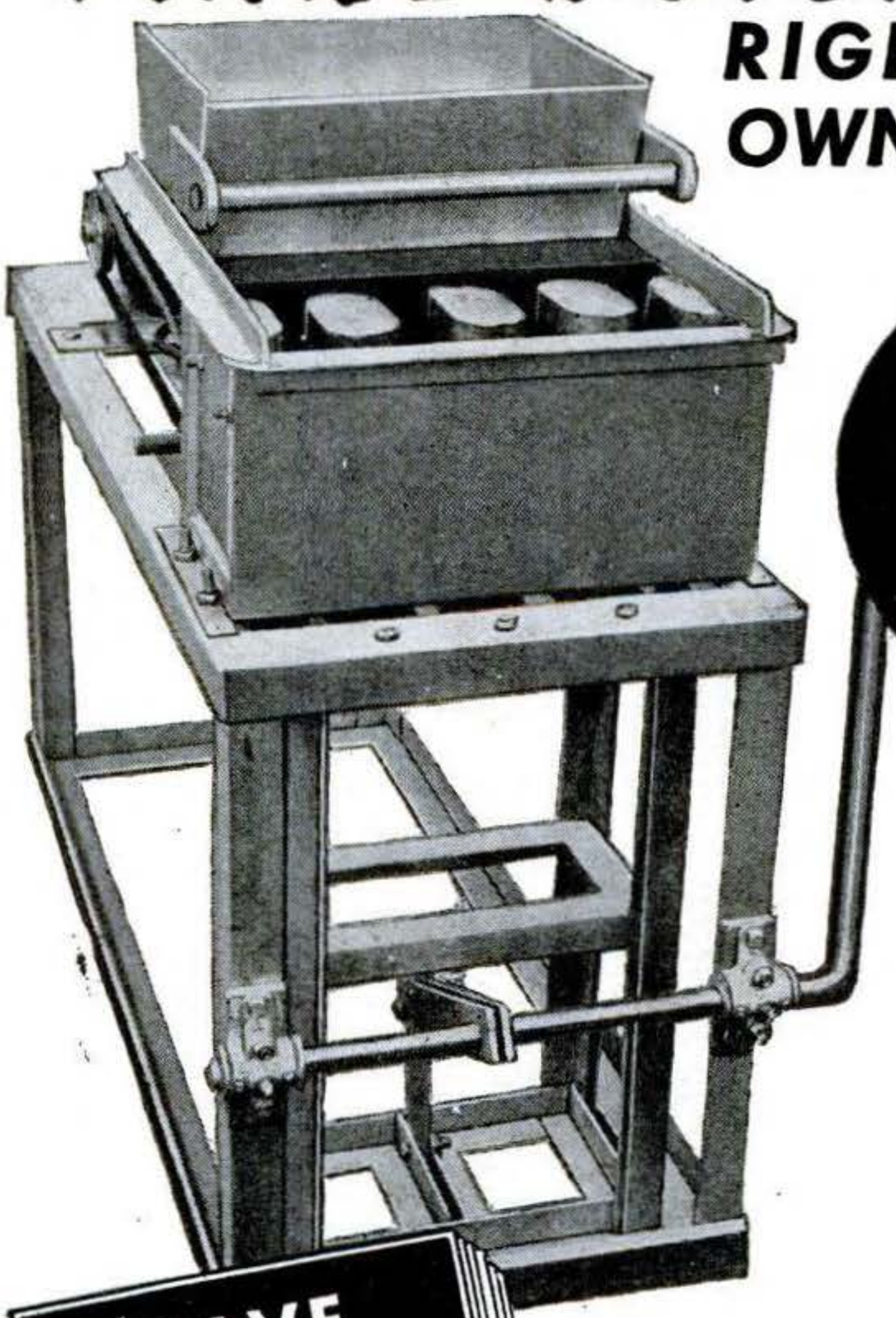
Fit-Rite Co., 1573 Milwaukee Ave.
Dept. 5-42 Chicago, Ill.

Copyrighted material

CASH IN ON THE BUILDING BOOM!

MAKE BUILDING BLOCKS

RIGHT IN YOUR OWN BACKYARD



AMAZING GENERAL BLOCK MACHINE

CAPACITY 1000 BLOCKS PER DAY

Only $199

Less Motor
Shipping Weight
400 lbs.

F.O.B. PHILA. 6, PA.

CINDER AND CEMENT BLOCKS IN BIG DEMAND . . . SELL ALL YOU PRODUCE TO CONTRACTORS, BUILDERS, SUPPLY YARDS AT 15c TO 25c EACH. EASY TO START A PROFITABLE BUSINESS.

General Block Machine can be operated indoors or out, in space 10 feet by 15 feet. Rugged construction. Vibrator shaft mounted in self-aligning sealed roller ball bearings. Very simple to run. Powered by ½ H.P. electric motor, or can be rigged for gasoline engine. Produces up to 1000 8x8x16 Blocks in 8-hour day—superior 3-core type, meeting all Building Code requirements. Can produce 8x8x16, 4x8x16, 8x8x8, chimney corner and cesspool Blocks. Ingredients for Blocks—cinders, cement, sand—readily obtainable anywhere in U.S. Full operating instructions and complete mixing formulas with each General Machine. Immediate delivery anywhere in U.S. Mail Coupon at once for further details, sent Free, without obligation.

TERRITORIES OPEN—DEALER INQUIRIES INVITED

SAVE MONEY BUILD THAT DREAM HOME of Beautiful CONCRETE BLOCK

Only $1 prepaid

Wonderful Booklet Written and Illustrated by Our Staff of Experts

Shows you how to save ⅓ to ½ by doing the easy work yourself.

Mail coupon at once

½ BAG CONCRETE MIXER

ONLY $299 COMPLETE

Powered with Briggs & Stratton 2.08 H.P. Air-Cooled Gas Engine. Rugged construction, simple design, mixes concrete, mortar, fertilizer, feed. Fully Portable. Goodyear pneumatic tires, roller bearing wheels, steel bowl, wheels into hard to get places. Just fuel, crank and start mixing. Instructions and parts list included. Immediate delivery.

GENERAL ENGINES CO.
(Eastern Division)
Drexel Building, Dept. S, Philadelphia 6, Penna.

☐ Rush FREE Literature on General Block Machine
☐ Rush FREE Literature, ½ Bag Concrete Mixer
☐ Enclosed find $1. For Your Wonderful Booklet "HOW TO BUILD YOUR OWN CONCRETE BLOCK HOME"

Name.....

Address.....

City.....Zone.....State.....

Copyrighted material

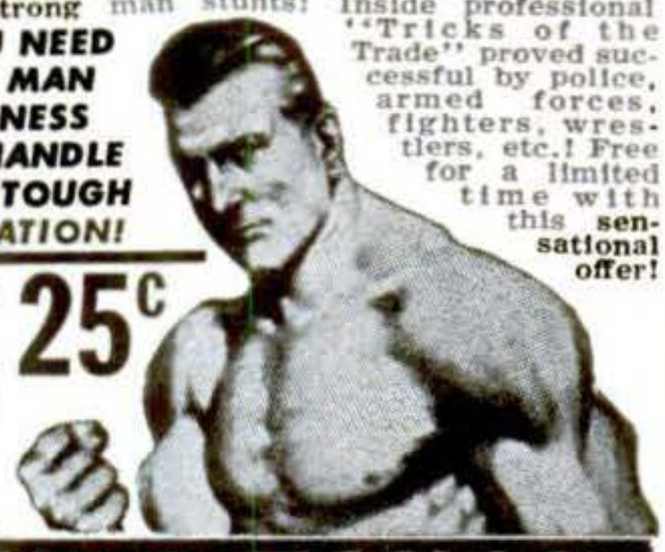
HOW TO Fight! Wrestle! Jiu-Jitsu!

FREE

Plus Weight Lifting! Strong Man Stunts!

Be prepared to protect your family, friends, yourself in any emergency! Be admired! George F. Jowett, Champion of Champions, gives you free his "SMASHING CHAMPION SECRETS." Contains many "HOW-TO-DO-IT" pictures that quickly and simply show you how to powerfully deliver a knockout, how to break any hold, how to overpower any opponent plus weight lifting and strong man stunts! Inside professional "Tricks of the Trade" proved successful by police, armed forces, fighters, wrestlers, etc.! Free for a limited time with this sensational offer!

YOU NEED HE MAN FITNESS TO HANDLE ANY TOUGH SITUATION!



NOW! All 5 Famous JOWETT COURSES in 1 Complete Muscle Building Volume! 25c

LET ME PROVE I CAN MAKE YOU—

COMMANDO-TOUGH

OR IT WON'T COST YOU A CENT!

says *George F. Jowett* WORLD'S GREATEST BODY BUILDER

Give Me 10 Minutes A Day Learn My Time Tested Secrets of Strength

I'll teach you the "Progressive Power Method" that rebuilt me from a physical wreck condemned to die at 15, to the holder of more strength records than any other living athlete or teacher! Has proven it builds the strongest, handsomest men in the world. Let me prove on a money back basis—that no matter how flabby or puny you are that I can add inches to your arms, broaden your shoulders, give you a man-sized chest, powerful legs and a rock-like back—in fact power pack your whole body so quickly it will amaze you—right in your own home! I'll bring to life new power in you inside and out, until YOU are satisfied you are the man you want to be.

PROVE IT TO YOURSELF IN ONE NIGHT

Send only 25c for my 5 easy-to-follow, picture-packed courses now in 1 complete volume "How to Become a Muscular He-Man." Try it for one night! Experience the thrilling strength that surges through your muscles.

I am making a drive for thousands of new friends fast—REGARDLESS OF COST!

SO GET NOW MY 5 Muscle Building COURSES

(Valued at $5 each)

All in 1 Great Complete Volume

Packed With How-To-Do-It Pictures!

Now, this "get-acquainted," extremely low price of only 25c is your chance to build a body you'll be proud of! Follow Jowett's easy method of muscle building NOW!

For Only 25c

10 DAY TRIAL!

Think of it—all five of these famous courses now in one picture-packed volume for only 25c. If you're not delighted with this famous muscle-building guide — if you don't actually FEEL results within ONE WEEK, send it back and your money will be promptly refunded!

PHOTO BOOK OF FAMOUS STRONG MEN!

FREE!

Photos that inspire you to might and muscle. Free with order.

2 FREE GIFTS!

Jowett Institute of Physical Culture Dept. PS-85
230 Fifth Avenue, New York 1, N. Y.

George F. Jowett:—Please send by return mail, postpaid, FREE "Smashing Champion Secrets" and FREE Jowett's Photo Book of Strong Men, along with all 5 Muscle Building Courses. **1.** Molding a Mighty Chest. **2.** Molding a Mighty Arm. **3.** Molding a Mighty Grip. **4.** Molding a Mighty Back. **5.** Molding Mighty Legs—Now all in One Volume "How to Become a Muscular He-Man." Enclosed find 25c. NO C.O.D.'S.

George F. Jowett Champion of Champions

NAME..... AGE....
(Please Print Plainly, Include Zone Number)

ADDRESS.....

Learn to Write

Send for this FREE Book

GOOD PENMANSHIP makes favorable impressions and helps you win success. Poor penmanship contributes to failure. It makes no difference how poor you now write, you can quickly and easily learn **Business Writing,** and you can learn **Shaded Writing** also right in your own home during spare time by my Simplified Method, without cost of going away to school. Easy Lessons. Diploma.

BEGIN NOW! write for my FREE BOOK, "How to Become an Expert Penman," which contains valuable information and many specimens that show what others have learned by taking my Courses. Send 10 cents for special penpoint and your name with a beautiful flourished bird written on a card.

T. M. TEVIS, BOX 25R, CHILLICOTHE, MO.

"YOU ARE UNDER ARREST!"

Help Bring Crooks to Justice Through Scientific

CRIME DETECTION!

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you **in your own home.** Learn Finger Printing, Firearms Identification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I. A. S. students or graduates. We can prepare you for this fascinating work during spare time. Write today, **stating age,** for "Blue Book of Crime."

INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 1365, Chicago 40, Ill.

LAW

STUDY AT HOME for Personal Success and LARGER EARNINGS. 39 years expert instruction—over 108,000 students enrolled. LL.B. Degree awarded. All text material furnished. Easy payment plan. Send for FREE BOOK NOW—"Law and Executive Guidance."

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 89-PS 646 N. Michigan Ave. Chicago 11, Ill.

LEARN TO DRAW & PAINT

LANDSCAPES, PORTRAITS, FIGURES, ANIMALS.
No Previous Training Necessary

IF YOU LIKE TO DRAW YOU HAVE TALENT YOU CAN DEVELOP THAT TALENT THROUGH OUR **HOME STUDY COURSE** LEARN TO DRAW AND PAINT IN YOUR SPARE TIME. WRITE FOR INFORMATION.

JOHN CLINTON ART INSTITUTE, Inc.
STUDIO C PALM BEACH FLORIDA

ANALYZE *Handwriting*

Uncrowded, fascinating field. Gratifying earnings reported by graduates in Employment, Credit, Social Service, Police and Entertainment fields. Others have developed profitable private practice, full or spare time, as Personal Problem and Vocational Counselors. Send for 3000 word TEST LESSON and Grapho Analyst FREE.

FREE BOOK and LESSON

A. I. G. A. Inc., Wilhoit Bldg., Dept. 126, Springfield, Mo.

CODE SPEED SHORT CUT

Be an expert. Learn to be a Telegraph or Radio Operator. Qualify for amateur or commercial license. Intensely interesting work—good pay. Learn at home or wherever you are, quickly, easily with the famous Candler Speed System. Book of particulars Free.

CANDLER SYSTEM CO., Dept. 6-E, Box 928, Denver 1, Colo. U.S.A.

---

3 In 1 AIR PISTOL

SPORTSMAN JR.—Sensational, low-priced air pistol. Ruggedly built, full size target gun shoots either standard BBs, pellets or steel darts. Fast, single-action compression chamber. Single shot, silent shooting. Use indoors or outdoors. Modeled after famous target pistol Economical to operate. Die cast all metal non-slip moulded grip; machined steel chamber and barrel. 8-in. long; 4½-in. deep; full size, weighs 15 oz. EACH **$3.49**

$3.49

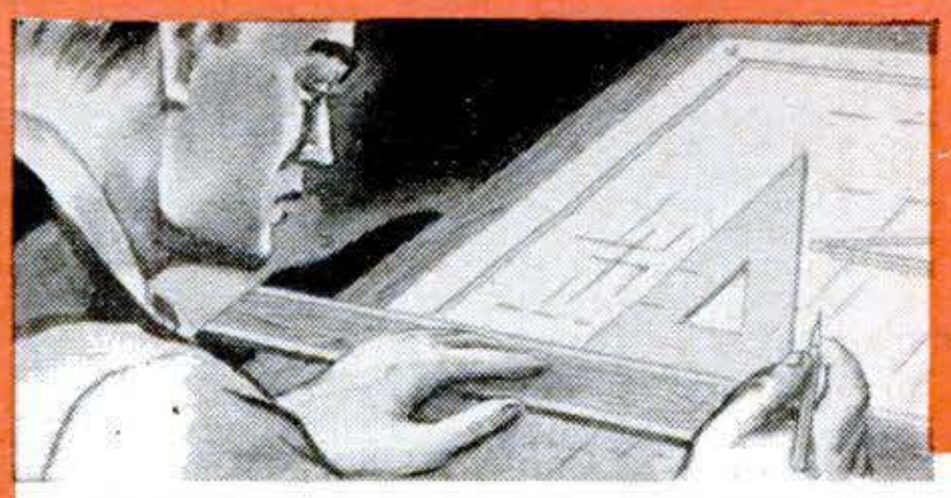
Shoots BBs Darts Pellets

Send No Money

BBs, 3 pkgs. 25c; .177 pellets, 500 for $1.50; steel darts, 35c package. (Holster 50c) Order Plenty.

We ship C.O.D.
JOHNSON SMITH & COMPANY, Dept. B-76, Detroit 7, Michigan

Copyrighted material



GET INTO DRAFTING

The Draftsman Plays a most Important Part in INDUSTRY

DRAWING OUTFIT INCLUDED
with Drafting courses.

All the tools you need including folding drawing table. With them you can put your ideas on paper quickly and with accuracy. With training you are all set to master Drafting in months, —not years—at home.

Learn in Spare Time—At Home!
(or at the College in Chicago)

A few hours of pleasant home study every week—that's all. With Chicago Tech's help, you train yourself step by step. This tested method—developed over 44 years of C.T.C. progress —prepares men for good positions in industry.

Practically everything that's built or manufactured these days is constructed from blue print drawings prepared by the draftsman. He is the KEY man in industry. No new machines can be built, no bridges erected, no buildings constructed until the draftsman has completed his work.

Drafting is clean, interesting, professional-type work. The draftsman is paid well to start. And he has real opportunities for advancement to high-pay jobs in Engineering. The tremendous production programs ahead in industry will require more draftsmen than ever before.

Send today for free information. See what this training has done for others, what it can do for you. Simply MAIL COUPON TODAY in an envelope or use a penny postcard.

CHICAGO TECHNICAL COLLEGE
E-225 Tech Building, 2000 South Michigan Ave.
Chicago 16, Illinois

MAIL COUPON NOW

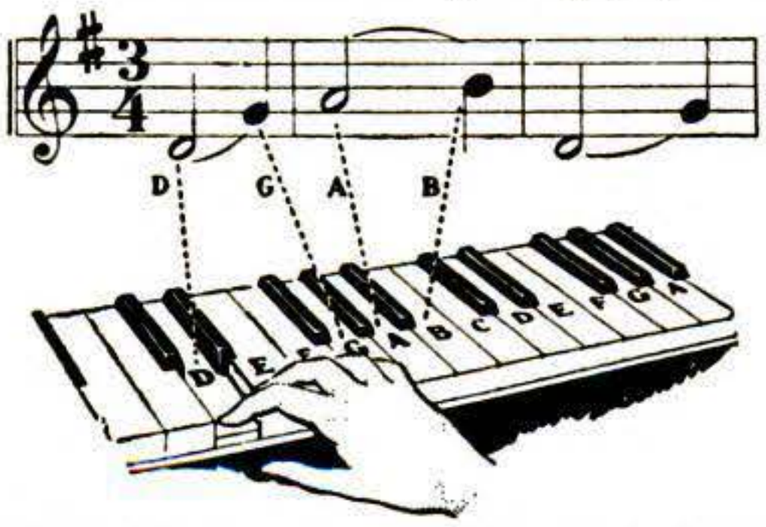
CHICAGO TECHNICAL COLLEGE
E-225 Tech Bldg., 2000 So. Michigan Ave., Chicago 16, Ill.
Mail me FREE Drafting Lesson with information about big opportunities in DRAFTING and how I can train at home.

☐ Architectural Drafting ☐ Electrical Drafting
☐ Machine Drafting ☐ Structural Drafting
☐ Builders' Course

Name.....Age.....
Address.....
City.....Zone...State.....

TO THOSE WHO THINK LEARNING MUSIC IS HARD

Just strike these notes and you're playing the beginning of the "Merry Widow" Waltz



Look at the diagram. The first note of the music is "D." Following the dotted line to the keyboard you'll find "D" is the white key between the two black keys near the middle of the keyboard. Now read below how you can learn to play any instrument quickly and easily.

EASY AS A-B-C — COSTS JUST A FEW CENTS A DAY!

● Perhaps you think learning music is a tedious grind. It isn't any longer! Long hours of practicing scales and monotonous exercise are over.

You have no excuse for not getting started toward musical good times now! For through an easy method you can now learn to play right at home—without a teacher—for a few cents a day.

Learn to Play by Playing

The lessons come to you by mail from the famous U. S. School of Music . . . complete instructions, clear diagrams, and all the music you need. You learn to play by playing real tunes by note. First you are told how to do a thing. Then a picture **shows** you how. Then **you** do it yourself and **hear** it. Remember, don't confuse our method with any system claiming to teach music "by ear" or by trick methods. We teach you to play only from real notes!

SUCCESS!
Here's what one of our thousands of pupils writes: "I learned more from your course than many of my friends who studied under private teachers have for years. The fact that I've already taken 2 courses and am now enrolling for a third should speak for itself." **F. A. S., Indiana.**

Don't delay. Send now for our illustrated Free Booklet and "Print and Picture" Sample which fully explain this remarkable method. So decide which instrument you want to play and mail the coupon today. U. S. School of Music, 85 Brunswick Bldg., New York 10, N. Y. (Successful 50th Year)

FREE! *Print and Picture Sample*

U. S. School of Music, 85 Brunswick Bldg., New York 10, N. Y.
Please send me Free Booklet and Print and Picture Sample. I would like to play instrument checked below.

Piano	**Saxophone**	**Modern Elementary Harmony**
Guitar	**Trumpet, Cornet**	**Mandolin**
Hawaiian Guitar	**Reed Organ**	**Practical Finger Control**
Violin	**Tenor Banjo**	
Piano Accordion	**Clarinet**	

Name.....Have You Instrument?.....
Address.....
City.....State.....

Save 2c—Stick Coupon on Penny Postcard

Copyrighted material

Coyne's invitation to "get acquainted"! Send for this GREAT BOOK—FREE. **Pay nothing—Buy nothing . . . It's YOURS!**

Full Size Diagrams • Complete Explanations

Contains 150 most useful **black** on **white** SHOP PRINTS **and** WIRING DIAGRAMS. Large size 8½" x 11". Step-by-step **explanations** with each diagram—Motors, Generators, Transformers, Radio Circuits, Frequency Modulation, etc. Gives valuable information to help you work faster and better.

We'll also send you free facts **on Coyne's** practical pay-raising books which help electricians **and radiomen** get ahead on the job.

SEND TODAY FOR YOUR *FREE* BOOK

The supply is limited so don't delay. FILL OUT AND MAIL **THE COUPON BELOW NOW before our** supply **is** exhausted.

EDUCATIONAL BOOK PUBLISHING DIVISION COYNE ELECTRICAL SCHOOL
500 S. PAULINA STREET, DEPT. 58-R8, CHICAGO 12, ILLINOIS

CLIP COUPON AND MAIL—TODAY!

Educational Book Publishing Division
COYNE ELECTRICAL SCHOOL, Dept. 58-R8,
500 S. Paulina Street, Chicago 12, Illinois
Please rush my FREE copy of Coyne's 150 Electrical Shop Prints and Wiring Diagrams. I am under no obligation to buy anything—no salesman will call.

NAME_____AGE_____
ADDRESS_____
CITY_____ZONE____ STATE_____
OCCUPATION_____

Now for **EVERY WORK SHOP!**

NEW Invention

Electroplates by BRUSH

Easy to Plate CHROMIUM
GOLD, SILVER, NICKEL, COPPER
. . . For Pleasure and Profit!

If you have a workshop—at home **or** in business—**you** need this new Warner Electroplater. **At** the stroke of an electrified brush, **you can** electroplate models and projects—**you can** replate worn articles, faucets, tools, fixtures, silverware, etc. with a durable, sparkling coat of metal . . . Gold, Silver, Chromium, Nickel, Copper or Cadmium. Method is easy, simple, quick. Everything **furnished**—equipment complete, ready for **use.** *By doing a bit of work for others, your* ***machine can pay for itself within a week.*** **So** make your shop complete by getting a Warner Electroplater right away. Send today for FREE SAMPLE and illustrated literature. ACT AT ONCE! *Mail Coupon.*

WARNER ELECTRIC CO., DEPT. S-16
1512 Jarvis Avenue, Chicago 26, Ill.

FREE *Details & Sample!*

WARNER ELECTRIC CO., 1512 Jarvis Avenue, Chicago 26, Dept. S-16
Gentlemen: Send Free Sample and Details to:
*Name*_____
*Address*_____
City *State*

Learn to Write

Short Stories, Mysteries, Articles—

Free Lesson Shows How You Learn at Home

The demand for writers is creating great new opportunities for people with an urge to write. It's not as hard to succeed as you may imagine. Most famous authors come from ordinary walks of life. At home, you too may learn fiction writing, the best basis for all fields—short stories, novels, features, articles, radio scripts. Palmer Institute's Home Study Training (Established 1917) is endorsed by Rupert Hughes, Ruth Comfort Mitchell, Gertrude Atherton, Katharine Newlin Burt and other famous authors and by scores of successful graduates. Complete instruction material and professional coaching to develop your own style. FREE book and sample lesson show how you many enjoy an ideal part time or full time career. Write today (no salesman will call). Veterans: advise us if you are eligible for G.I. Training.

PALMER INSTITUTE OF AUTHORSHIP • Desk U-58
1680 N. Sycamore • Hollywood 28, Calif.

Learn To MOUNT BIRDS

Tan SKINS, Make Up FURS

Be a Taxidermist. *Double your hunting fun.* We teach you **at Home.** Mount **Birds, Animals, Pets, Heads and Fish.** Save your hunting trophies; decorate home and den. **MAKE MONEY.** Mount and Krome-tan for others. Big sparetime profits. **INVESTIGATE TODAY.**

FREE BOOK **with 100 game pictures.** 48 pages. Hunters, get yours! It's **Now Free.** Send postal card **TODAY -- This Minute!** State your **AGE.**

NORTHWESTERN SCHOOL OF TAXIDERMY; Dept. 3395, **Omaha, Nebr.**

STAMMER?

This new 128-page book, "Stammering, Its Cause and Correction," describes the Bogue Unit Method for scientific correction of stammering and stuttering—successful for 47 years. Benj. N. Bogue, Dept. 4826, Circle Tower, Indianapolis 4, Ind.

GET THIS FREE BOOK!

Learn* BAKING *At Home

Baking is one of America's high industries in wages. Nearly depression-proof. Thorough basic home course lays sound foundation. If you have aptitude, write for FREE BOOKLET, "Opportunities in Commercial Baking."
National Baking School, 1315 Mich. Ave., Dept. 1365, Chicago 5

BARGAINS UNLIMITED

Hundreds of money-saving values at today's lowest prices—for your every need.

FREE CATALOG of Refrigeration, Radio, and electrical Supplies. Send for yours at once!

G. & E. EQUIPMENT SUPPLY CO.
Ogden at Fulton **Chicago 7, Ill.**

A PROFITABLE TRADE! AN EXCITING HOBBY!

***Learn...* PHOTO NEGATIVE RETOUCHING**

$17.50

Increase your income . . . Improve the quality of your own photography. New 5 week home study course—1 lesson each week—will teach you how. Complete course and all necessary equipment only $17.50. For FREE brochure and complete details write today!

MARSHALL PHOTOGRAPHERS, Inc. School Division
162 N. State St. Dept. PS-5 Chicago 1, Ill.

DETECTIVES

Home Study in Detective Training—Professionally Modernized —Recognized Instructors—Easy Payments—Write
INTERNATIONAL DETECTIVE TRAINING SCHOOL
1701-P Monroe St. N. E. **Washington 18, D. C.**

★ **PSORIASIS** ★

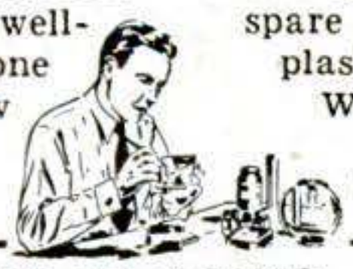
PSORIASIS SUFFERERS: Has everything failed to bring even temporary relief from scales, lesions and itching? Then write today for FREE important information. You needn't invest one cent!
PIXACOL CO., Dept. S-5, Box 3583, Cleveland, Ohio

Copyrighted material

SALES ENGINEER | MOLD DESIGNER | RESEARCHER | FABRICATOR | LAMINATOR | PARTS INSPECTOR | MOLDING TECHNICIAN | YOUR OWN BUSINESS

WHICH CAREER IN PLASTICS DO YOU WANT?

Plastics is one of the fastest growing industries—offering you unusual opportunities for an interesting, successful career and security in the years ahead. Trained men, with plastics know-how will fill the important, well-paying positions. YOU can be one of them Mail the coupon below for a big, colorful, free catalog on Plastics and complete details about Plastics Institute, America's oldest and largest plastics school. Resident School located in beautiful Southern California Comprehensive Home Training Courses to prepare you in your spare time at home for a career in plastics. You can enroll immediately! Write Plastics Institute, Dept. PS-58, 1601 S. Western Ave., Los Angeles 6, California.



APPROVED FOR VETERANS

LEARN BY DOING

To give you practical experience we supply colorful plastics to make useful, attractive creations. You can also make and sell plastics articles to earn while learning

Plastics INDUSTRIES TECHNICAL INSTITUTE

NEW YORK CHICAGO LOS ANGELES

FREE BOOKLET

Plastics Industries Technical Institute
Dept. PS-58, 1601 S. Western Ave., Los Angeles 6, Calif.

Mail in Envelope or paste on penny postcard

Gentlemen: Please send me the booklet "World of Plastics" and information on your Resident School Courses ( ) Home Training Courses ( ) I understand there is absolutely no obligation

Name (PRINT)..... Occupation.....

Street (PRINT)..... Age.....

City..... Zone..... State.....

Important: Please fill out coupon **Completely.** If non-veteran, please check, ( )
If in Armed Services now, please check, ( )

PLASTICS INSTITUTE in the heart of sunny Los Angeles. Here modern laboratories and shops give Resident School students facilities for practice on the finest of industry-type plastics equipment. Also the headquarters for HOME TRAINING.

WHICH OF THESE *Opportunities* INTERESTS *You* MOST?

● *Today,* choose the job you want—and prepare for it. Or if you are already engaged in the work you like best, start training *now* for quicker promotion. Acquire the knowledge that will help you to get ahead faster, make more money and have greater security.

American School, founded in 1897 as an educational institution *not for profit,* can help you to reach your goal just as it has helped others during the past fifty-one years. Check the coupon at right, add your name and address and mail it at once. The school will send you details on its training plan and outline of study prepared by specialists. There is no charge, no obligation, so send the coupon immediately.

AMERICAN SCHOOL

Dept. G-546, Drexel at 58th Street, Chicago 37

CHECK, CLIP AND MAIL COUPON NOW

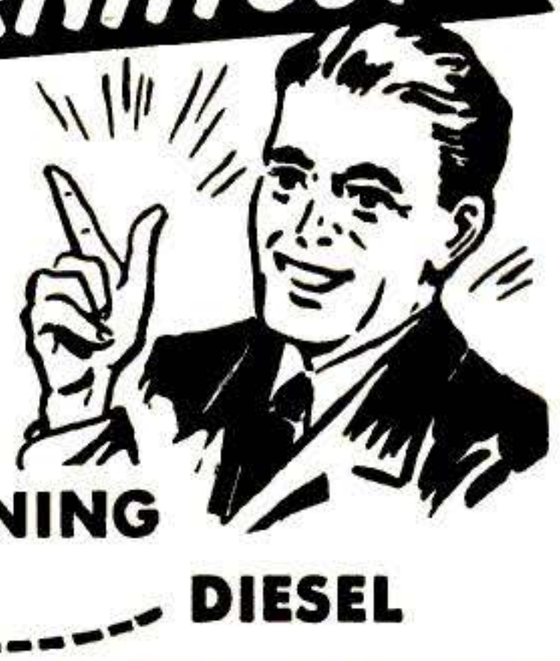
AMERICAN SCHOOL, Dept. G-546, Drexel at 58th, Chicago 37, Ill.
Without obligation, Please send FREE and postpaid, bulletin and details of the Subjects checked:

- ☐ PLASTICS ENG'R
- ☐ Refrigeration
- ☐ Architecture and Building
- ☐ Contracting
- ☐ Practical Plumbing
- ☐ Automotive Engr.
- ☐ Aviation Drafting
- ☐ Aviation
- ☐ Business Management
- ☐ Accounting
- ☐ Electrical Engr.
- ☐ Electricity-Pract.
- ☐ Electronics, Industrial
- ☐ Bookkeeping
- ☐ Private Secretary
- ☐ Diesel Engineering
- ☐ Sheet Metal Pattern Drafting
- ☐ Railway Training
- ☐ Drafting and Design for Men and Women
- ☐ Radio
- ☐ High School
- ☐ Air Conditioning
- ☐ Mechanical Eng.
- ☐ Shop Management
- ☐ Tool Making
- ☐ Better Foremanship
- ☐ Machine Shop Operations

Name..... *Occupation*.....
Address..... *Age*.....
City..... *State*.....

Copyrighted material

These Trades Pay HIGH EARNINGS!



AUTO BODY & FENDER WORK

REFRIGERATION

AIR CONDITIONING

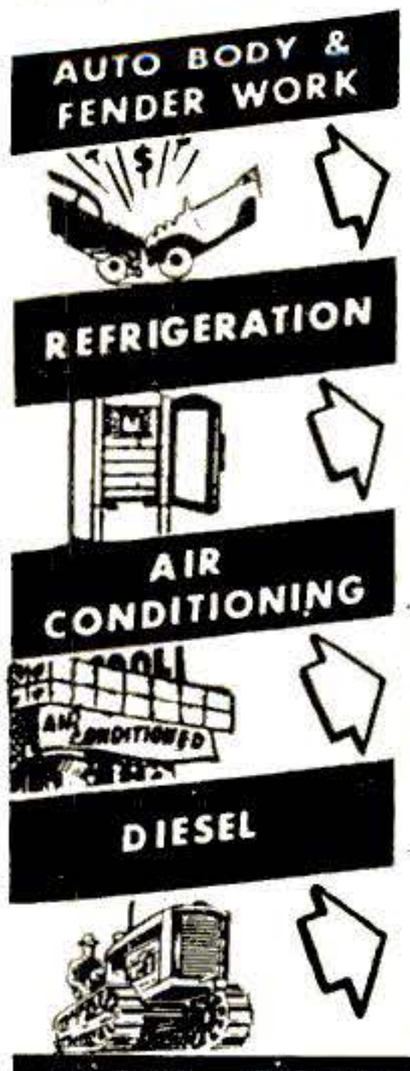
DIESEL

These fast-moving mechanical trades offer many fine, big-paying jobs in big cities and small towns. As a result, there is a steady demand for qualified men . . . men with training, to grow with these industries . . . perhaps have businesses of their own.

UEI training is available to mechanically inclined men between the ages of 17 and 60. You can get thorough, practical instruction in your spare time while you keep your present job. This is followed by actual 'shop practice' with modern, costly equipment. Experienced instructors teach you in easy-to-understand lessons—by methods that have produced so many successful graduates.

UEI residence courses, too, offer the same careful training using the same costly equipment for the shop work . . . in day and evening classes.

Don't delay another day. Act NOW! Send in the coupon below for FREE facts on the UEI training and opportunities in the big paying trade you prefer. Don't wait . . . Write at once!



U. E. I. Training Opportunities

Practical shop training follows preliminary spare time course . . . includes welding, metal work, and auto painting.

Complete training from fundamentals to installation and repair service of all commercial and domestic types.

From basic principles to actual practice of installing and maintaining home and industrial equipment.

Men who *know* Diesel teach engine operation, fuel systems, auxiliary equipment, repairs and maintenance on all types of Diesel installations.

UTILITIES ENGINEERING INSTITUTE
(Founded 1927)
DEPT. 358
CHICAGO 14, ILLINOIS

MAIL COUPON FOR FREE FACTS

UTILITIES ENGINEERING INSTITUTE, Dept. 358
2525 Sheffield Ave., Chicago 14, Ill.

Please RUSH me FREE facts about UEI training and opportunities in the field checked below.

☐ Auto Body and Fender Work ☐ Air Conditioning
☐ Refrigeration ☐ Diesel

Name _____ Age _____

Address _____

City _____ Zone or County _____ State _____

☐ Check here for special information if you are under 17.

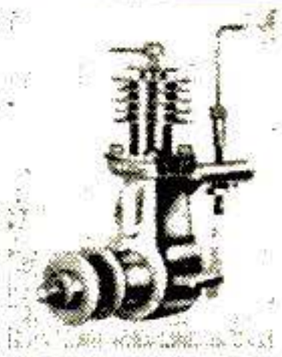
STEP INTO THE AUTOMOTIVE INDUSTRY—A TRAINED MAN!

PRACTICAL SHOP TRAINING
IN
AUTOMOTIVE MECHANICS
BODY and FENDER REBUILDING

If interested write or wire

ATLANTA MOTIVE TRADES INSTITUTE Dept. C, 254 IVY St., N.E. Atlanta, Georgia

Veterans ask about G I Training



REAL DIESEL ENGINE

For Model Planes, Boats and Race Cars. Now you can own and run a real miniature Diesel engine that operates by the heat of compression. No coil, condenser, wires, or annoying ignition failures. Simply flip the prop or flywheel to start. It's the new DEEZIL—a .125 cu. in. displacement, 5 oz. engine that runs at 8000 RPM. Order today; only $12.95 p.p., less tank. Every engine fully tested and guaranteed. DEEZILMIX FUEL $1.00; PROP 50c.

Send For Valuable Free Price List!

GOTHAM HOBBY
107 East 126th Street New York 35, N.Y. Dep't S

HELP FOR INVENTORS

Hundreds of manufacturers have requested our assistance in locating marketable new products.

Complete information, free.

INSTITUTE of AMERICAN INVENTORS
Dept. 3, 1926 Eye St. N.W., Washington 6, D. C.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building, Washington 1, D. C.

PATENTS AND TRADE MARKS
C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
246 SNOW BUILDING, WASHINGTON 1, D. C.

***Thrilling Work* COLORING PHOTOS**

Fascinating vocation learned at home by those with aptitude. Thrilling pastime. National method brings out life-like colors. Free booklet.

NATIONAL PHOTO COLORING SCHOOL
1315 S. Michigan, Dept. 1365, Chicago 5

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "Record of Invention" form.

CARL MILLER
REGISTERED PATENT ATTORNEY

Woolworth Bldg., 35th Floor, Dept. 58-C, New York City
Please send me "Record of Invention" form.

NAME . . . . . .

ADDRESS

Copyrighted material

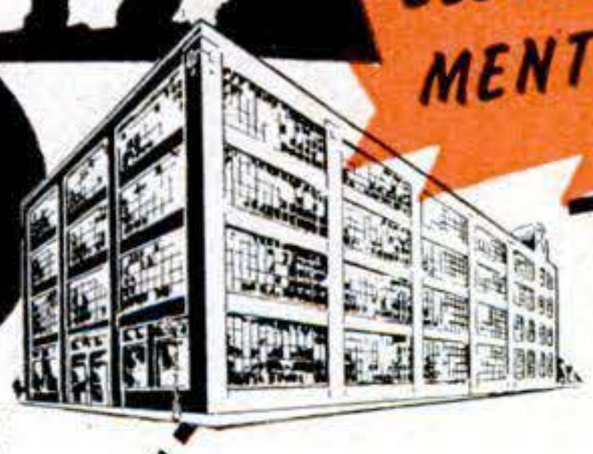
AMERICA'S GREATEST ELECTRICAL SCHOOL OFFERS YOU

MORE EQUIPMENT! MORE SPACE! MORE TRAINING!

OVER **1000** PIECES of ACTUAL ELECTRICAL EQUIPMENT to WORK ON!

Learn ELECTRICITY

In NATION'S LARGEST EXCLUSIVE ELECTRICAL SCHOOL



It's Easy - "LEARN-BY-SEEING" MOVIES
It's Fast - "LEARN-BY-DOING" METHODS

and its THOROUGH! . . . There is *no other place—no other way* to get the same all-around training you get at M.T.I. NOT A HOME STUDY COURSE! . . . You get actual "hands-on-equipment" training in great MODERN SHOPS in Detroit. No previous experience necessary. Learn HOUSE WIRING, A.C., D.C. MOTORS, ARMATURE WINDING, POWER PLANT WORK, etc. New classes start every few weeks. Part time work available. Living arrangements made.

NO COST TO VETERANS *Train at Gov't. expense. Receive $75 to $120 month while learning. Coupon brings details.*

MAIL TODAY FOR QUICK ACTION!

MICHIGAN TECHNICAL INSTITUTE
Department PS-5, 2281 West Fort Street, Detroit 16, Michigan

MICHIGAN TECHNICAL INSTITUTE, Dept. PS-5
2281 W. Fort St., Detroit 16, Michigan

TAKE MORE STEP

☐ Send me catalog and complete information.
☐ I am a GI. Send special information.
☐ Married. ☐ Single

NAME _____
ADDRESS _____
CITY _____ ZONE ____ STATE ____

APTITUDE TESTS discover the kind of work or studies best for your success! You get a personal report—a guide for life—more happiness—more prosperity. (for men, women, boys, girls.) Write for complete facts

VOCATIONAL COUNSELING INSTITUTE
5057 Woodward Ave., Detroit 2, Michigan

RADIO ENGINEERING Television, FM, Broadcasting, Servicing, Electronics, Aviation, Marine & Police Radio taught thoroughly. 72 weeks' Engineering course equivalent to 3 years' college radio work. Approved Veteran Training. Catalog upon request.

Valparaiso Technical Institute, Dept. 503, Valparaiso, Ind.

BLISS ELECTRICAL TRAINING

ELECTRICAL SCHOOL

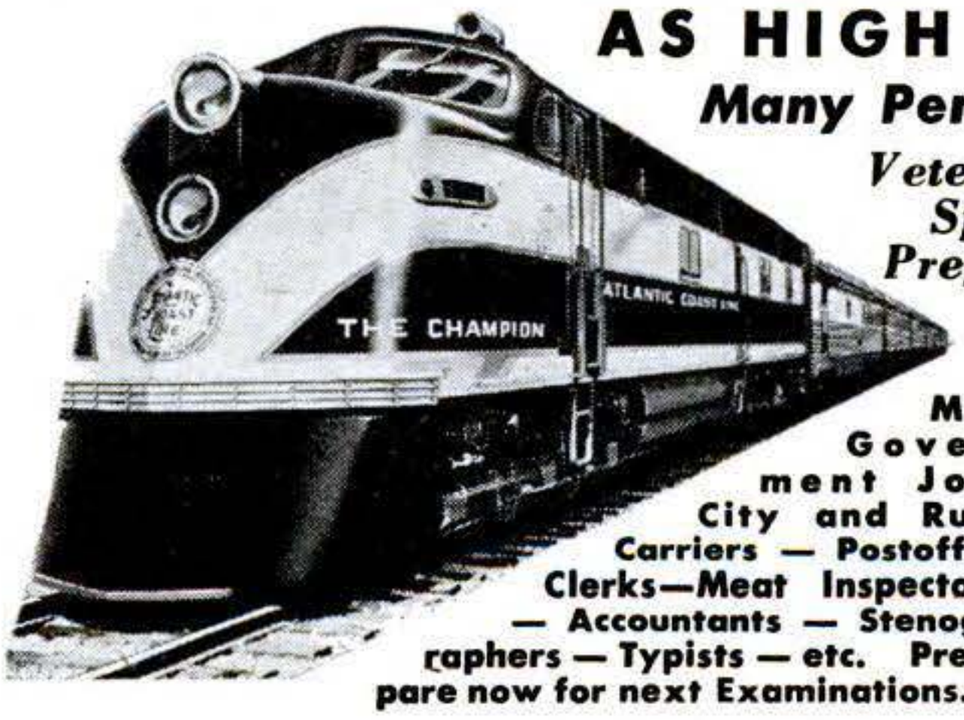
Intensive 32 weeks' residence course in fundamentals of **industrial electrical engineering,** including radio, electronics. Prepares for technician, engineering aides. Approved for veteran training. 54th year. Enter July 26, Nov. 22. Catalog.

7608 TAKOMA AVENUE, WASHINGTON 12, D. C.

U. S. GOVERNMENT JOBS!

AS HIGH AS $3,021 FIRST YEAR

Many Permanent Appointments Being Made



Veterans Get Special Preference

Many Government Jobs. City and Rural Carriers — Postoffice Clerks—Meat Inspectors — Accountants — Stenographers — Typists — etc. Prepare now for next Examinations.

FRANKLIN INSTITUTE,
(Not Government Controlled)
Dept. B80, Rochester 4, N. Y.

Sirs: Rush to me, without charge, copy of 32-page book, "How to Get a U. S. Government Job," list of positions, and full particulars telling how to prepare for them.

NAME.....

ADDRESS.....*VET?*.....

Copyrighted material

Learn to Repair ELECTRIC APPLIANCES

AT HOME in your SPARE TIME

Prepare now for a permanent future, independence and security with a business of your own. Our practical, easy-to-learn home course teaches you, during your spare time, how to repair washing machines, vacuum cleaners, electric ranges, lamps, motors, irons, etc., REFRIGERATION and HOUSE WIRING.

WRITE TODAY for FREE BOOK

OPEN YOUR OWN SHOP

For the man who is handy with tools, and likes to work with his hands as well as his head, there is a WIDE OPEN OPPORTUNITY today, in this great growing field. If you own your own shop you can depend on making more money in good times . . . and not losing your job in a depression. You can start a business of your own in your garage or basement with the tools we send you. One good repair job can pay for the cost of the entire course. Write today for our FREE BOOKLET.

I Send You a BIG KIT of Special TOOLS at NO EXTRA COST!

PACIFIC TRAINING SCHOOL
7217 So. Broadway, Dept. S-85, Los Angeles 3, Calif.

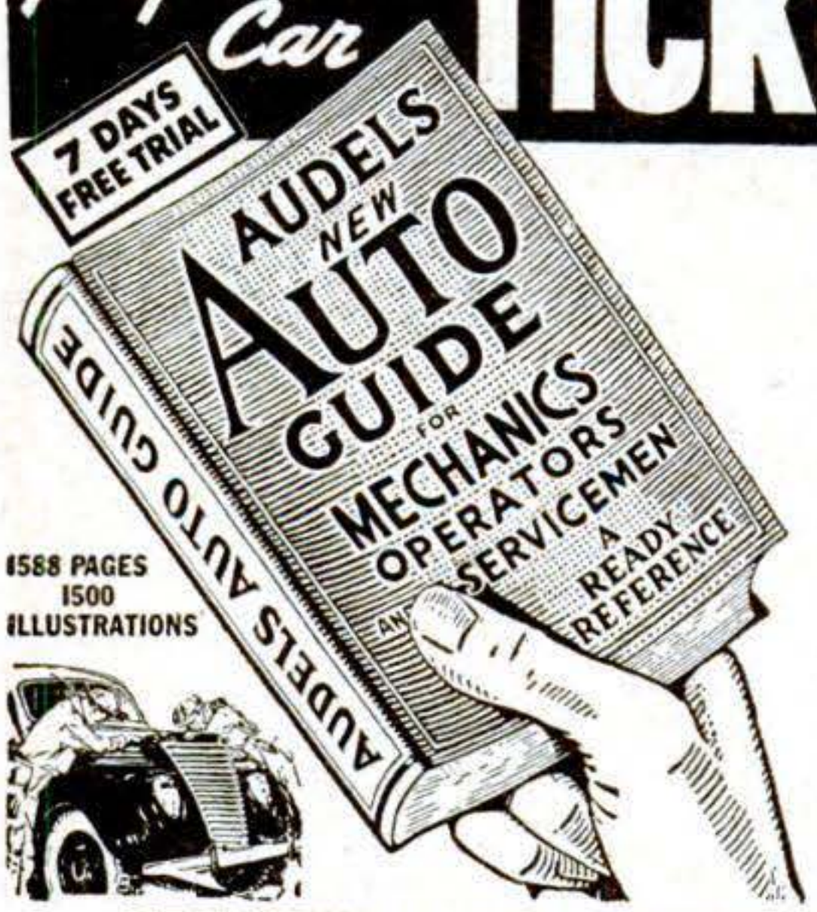
Dear Sirs: Please send me, without obligation, your free booklet and complete details.

Name .....

Address .....

City ..... *State* .....

Keep that "Car TICKING"



Every operator and mechanic needs AUDELS AUTO GUIDE.

This book saves time, money and worry. Highly endorsed. It presents the whole subject of auto mechanics:

1—Basic principles
2—Construction
3—Operation
4—Service
5—Repair

Handy Size. Easily understood.

NEW FLUID DRIVE, HYDRAULIC SHIFT AND DIESEL ENGINES FULLY COVERED

Over 1500 pages—1540 illustrations showing inside views of modern cars, trucks and buses with instructions for all service jobs.

$4 ASK TO SEE IT!—To Get This Assistance for Yourself Simply Fill in and Mail Coupon Today.

COMPLETE • PAY ONLY $1. A MONTH ←

AUDEL, Publishers, 49 West 23rd St., New York
MAIL AUDELS NEW AUTO GUIDE for free examination. If O.K. I will send you $1 in 7 days; then remit $1 monthly until price of $4 is paid. Otherwise I will return it.

Name.....

Address.....

Occupation.....

Employed by..... P.S.M.

BE FAIR TO YOUR HAIR Want better looking hair? Embarrassed by falling dandruff, itching scalp? Then try VITABRUSH, new electric driven scalp brush that gives your scalp a vigorous and invigorating "workout" in just three minutes of fun. Cleans scalp. Stimulates blood supply. Restful. Pleasant. Write *today* for complete information and satisfaction-guaranteed offer. Hershey Mfg. Co., 3799 Field Bldg., Chicago 3

MAKE JEWELRY AND NOVELTIES AT HOME!

Work right on your kitchen table! No tools or experience needed. Learn—earn within a week. Complete home instruction course, beautifully photographed, shows how to make 138 designs of pins, earrings, sprays, hair-do's, bracelets, candy dishes, jewel boxes, wall plaques, perfume bottles, novelties, etc. Shows over 100 kinds of Sea Shells and Plastics often used. Explains fully home methods of dyeing, pearlizing, golding, tinseling, frosting and luminous processes. Lists 200 kinds of raw materials with wholesale prices. Complete course only $1. Beginner's Kit, $3 (Foreign $4). Prepaid.

HOUSE OF GIFTS, Box 4550-RS, Coral Gables, Fla.

LEARN AND EARN AT HOME

Learn SCREEN PROCESS, the modern machineless method of printing. Uncrowded, profitable field where trained men are always in demand. 2 BIG KITS OF SUPPLIES we send start many of our students making money even before finishing home study course. Write today for FREE BOOK giving full details. APPROVED FOR VETERANS.

California School Of Screen Process, 3740 Overland Avenue, Dept. S-58, Los Angeles 34

INVENTIONS WANTED AT ONCE

Patented or unpatented inventions, all types needed by manufacturers. Write for free booklet "MARKETING YOUR INVENTION" and Protective Disclosure Form. We have a tremendous list of firms who may pay cash or royalties for good inventions. For full particulars, write today.

NATIONAL INVENTION SERVICE
1404 Mitchell Street, Dept. A — Oakland 1, Calif.

Say You Saw It In Popular Science

FLOCKING or SANDBLASTING GUN

Works on small air compressor $16.95

The most Decorative Gun on market, 101 uses. Home Craftsman, Hobbyist, or Refinisher—Spray that velvet Suede Finish on your Radio Cabinet, Lamp, Base, or Shades, Book ends, Statuettes, Jewelry, Boxes, Auto, Dashboard. Make things Snagproof, Marproof, Cushioning, Art or Sign Work, Print Goods. Sand Blast Designs on glass. For frosting glass, putting names on tools, wood or metal. Remove paint or rust from auto bodies. This alone is worth $16.95. Shipped complete with flock ready to use. 5-day money back guarantee. $16.95 money with order, postpaid, USA. Aluminum alloy castings, brass fittings, chrome molybedenum heat-treated sand nozzle and air jet. Calif. order send 2½c sales tax.

BLASTO SPRAY GUN MFG.
Dept. S5, 7007 Haas Ave., Los Angeles 44, Cal.

RUPTURED?

Get Relief This Proven Way

Why try to worry along with trusses that gouge your flesh—press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening—follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing **FREE** book, "Advice To Ruptured," and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

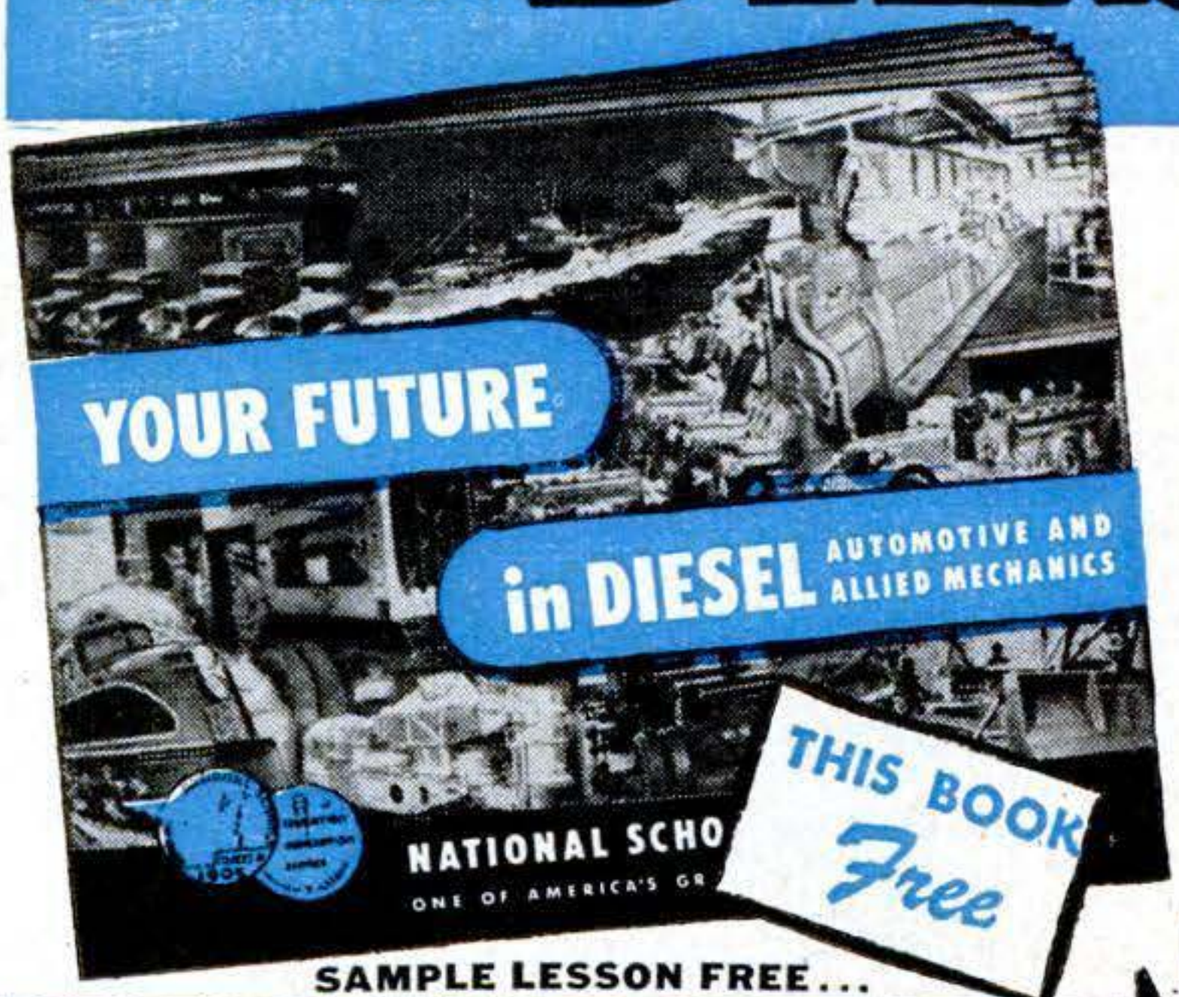
Cluthe Sons, Dept. 14, Bloomfield, New Jersey

Copyrighted material

LEARN ALL ABOUT DIESEL

Train at Home in Spare Time

AUTOMOTIVE & ALLIED MECHANICS



SAMPLE LESSON FREE...

MAIL THIS COUPON

Find out what National Schools can do for you . . . Learn how you can grasp opportunity in the great Diesel and Automotive Industry. Send the coupon below for a **Sample Lesson** From National Schools' Shop Method Home Training, and an **illustrated Book of Facts** giving you complete information to build an interesting career.

Shop Method Home Training comes out of the Famous National Schools' Training Shops and Laboratories

National Schools instructors are daily training resident students in our modern, fully equipped Shops and Laboratories, using the same instruction methods and lessons you study at home. These expert instructors **know how** to qualify you for success . . . Get the facts TODAY!

Diesel is becoming more and more important in transportation, industry and agriculture all over the world. With National Schools' tested and proved Master Shop Method Home Training, you can become a qualified Diesel, Automotive and Allied Mechanics Technician equipped to step right into this opportunity field on a sound, practical basis.

National Schools-trained Diesel and Automotive Technicians Are in Demand

Established in 1905, this great Technical Trade School has the modern facilities to help you secure an attractive position with manufacturing organizations, railroads, oil and construction companies, garages and many other branches of the industry, or you can build a substantial business of your own. Here is thorough, practical, authoritative training that has helped National Trained Men win success everywhere!

MAIL OPPORTUNITY COUPON FOR QUICK ACTION

BOTH HOME STUDY AND RESIDENT TRAINING OFFERED

NATIONAL SCHOOLS

LOS ANGELES 37, CALIFORNIA EST. 1905

D NATIONAL SCHOOLS, Dept. PSD-5
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny postcard)

Mail me FREE the book, YOUR FUTURE IN DIESEL, together with the Sample Lesson. I understand I may keep and use the information with no obligation.

NAME.....AGE.....

ADDRESS.....

CITY.....ZONE....STATE.....

....Check here if Veteran of World War II
Approved For Veterans

FIX SEWING MACHINES

BIG MONEY. Spare or full time. Open your own neighborhood shop. Thousands need repairs. Send for complete Service Manual—only $1.98 postpaid. Money back guarantee.

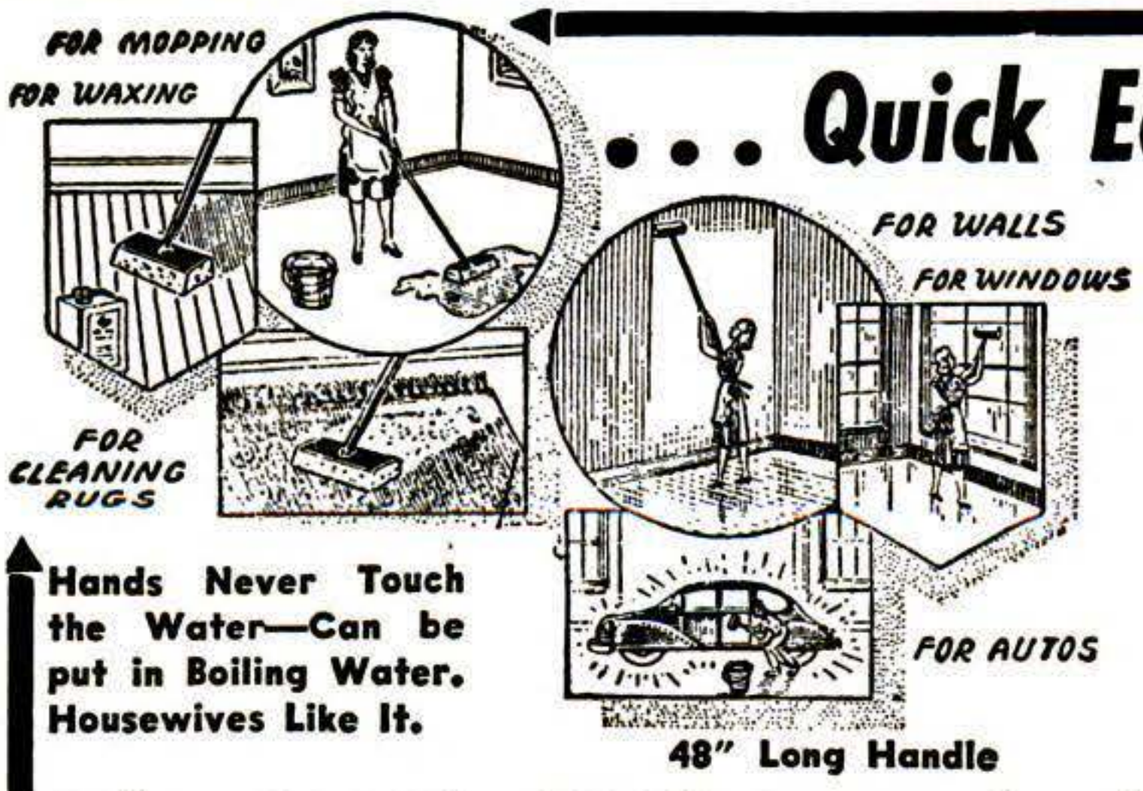
SEWING MACHINE SERVICE CO. Hamilton 26-AA, Ohio

HYPNOTIZE

Learn modern speed hypnotism. Self-hypnosis. Secrets revealed. Exciting experiments. Overcome inferiority complexes, smoking, alcoholism, stuttering, nailbiting, phobias, insomnia, stagefright. Improve your memory. Private & class instruction available at Institute. Complete practical homestudy course....$2. Hypnotism record album for mass-hypnosis & self-hypnosis.....$5

Powers Institute of Hypnotism, 1324 Wilshire Blvd., Dept. 32, Los Angeles 14, Calif

---



Hands Never Touch the Water—Can be put in Boiling Water. Housewives Like It.

48" Long Handle

. . . Quick Easy Way to BIG PROFITS

Read What Others Are DOING!

"Enclosed you will find 56 orders representing 9½ hours' work on Monday and Tuesday."

"Enclosed are twelve orders secured after supper this p.m."

Housewives are Enthusiastic

Everyone that sees this outstanding Cell-U-Mop immediately wants one . . That's the reason why our distributors are so successful . . You also have the advantage of our other QUICK SELLING PRODUCTS that step up your *Volume Sales and Profits.*

Sales QUICK, EASY *Every Locality*

SALES ARE EVERYWHERE . . Sells quick to Taverns, Clubs, Hotels, Hospitals, Stores, Restaurants, Large and Small Buildings and the Homes . . Scores can be sold on a single street . . Note the Drain Bracket in the illustration . . This squeezes out the water so thoroughly that HANDS NEVER TOUCH THE WATER . . Makes no difference what you ever sold, you will like this proposition . . Your name on a Post Card will bring you FREE PARTICULARS.

CELL-U-MOP CO., Dept. PS-5 FREEPORT, Ill.

• We Teach You How •

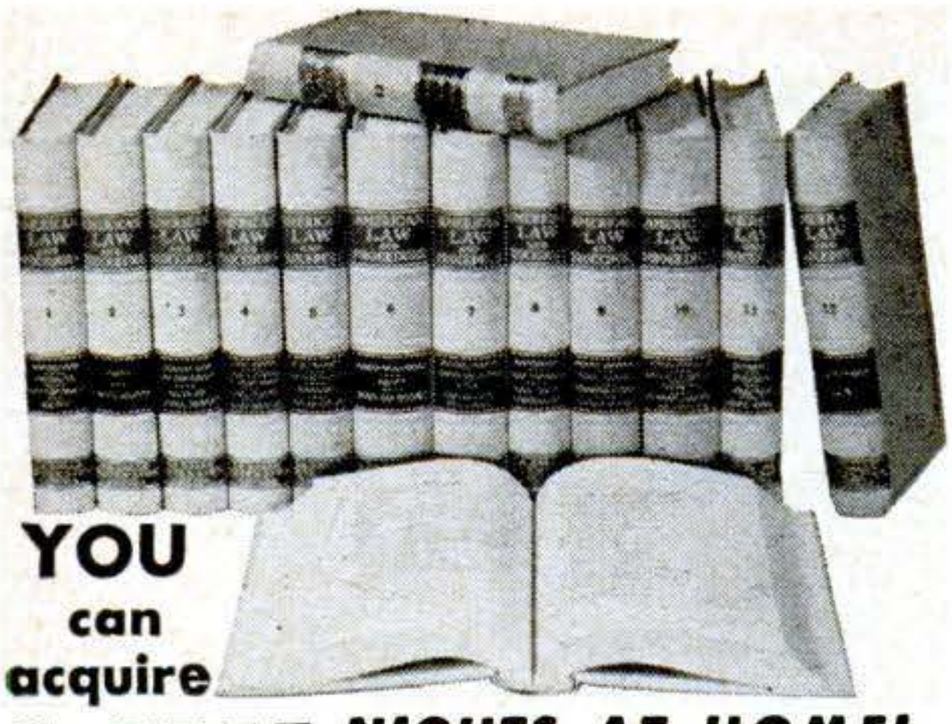
Gets down under and around for MOPPING, DUSTING or WASHING

Get Choice Territory NOW!

DOES THE WORK OF 6 TOOLS IN 1

Holds 20 times its weight in water.

Copyrighted material



YOU can acquire

LAW NIGHTS AT HOME! L.L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution
417 S. Dearborn St. Dept. 583-L Chicago 5, ILL.

Send me your two FREE booklets described above, without obligation.

*Name*_____ *Age*_____

*Street*_____

*City, Zone & State*_____

BE A SUPERVISOR

Franklin Technical Institute Helps Young People Get Ahead

• The door to well-paid supervisory jobs in industry is wide open — to the man or woman with specialized technical training. 50,000 graduates of this Boston school have gone out to good jobs in engineering and technical fields.

Practical courses in industrial electricity and electronics, industrial chemistry, mechanical and machine design, structural and architectural design, automotive service and management, electric wiring and maintenance. Also preparatory course. Approved for veterans. 40th year.

FRANKLIN TECHNICAL INSTITUTE
39 Berkeley St. Boston, Mass.
Please send free information on all courses.

*Name*_____ *Age*_____

*Address*_____

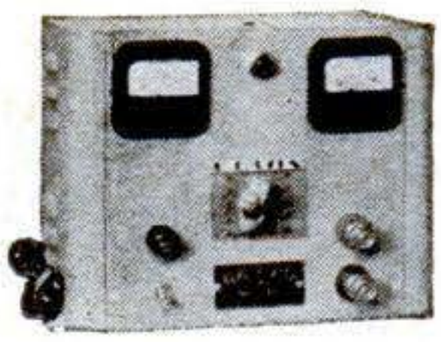
*City*_____ *State*_____

NOW! YOU CAN HAVE YOUR OWN

ELECTRO-PLATING Business

Plate GOLD - SILVER - CHROMIUM, etc.
It's Profitable - Simple - Pleasant

Do as hundreds of successful men are now doing — start your own business! You can plate on metals and non-metals with the VARI-PLATER. Your cost is low, profits are BIG! Don't let this money-making opportunity go by!



FREE! Write now for descriptive information and complete price list!

The VARI-PLATER — 110 V., A.C., complete **$55.00**

LEWIS ELECTRICAL MFG. CO. 1943-B Walton Ave. New York 53, N. Y.

Hey-KIDS! *And Grown-Ups, too! HERE'S the SENSATION OF THE AUTO AGE*

THE AMAZING

MYSTERY CAR

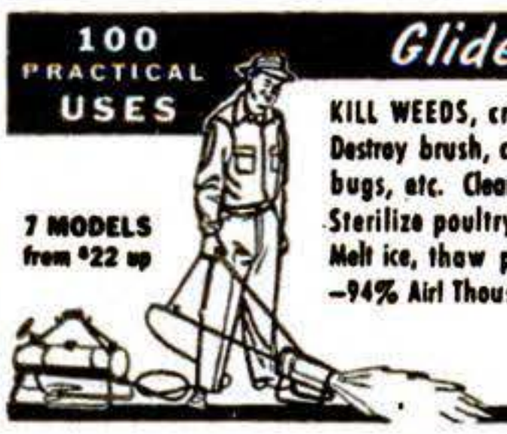
Want to keep your gang guessing? Get the PUZZLE CAR—the laugh-mystery of the year! 'Round and 'round it goes—and why it turns, nobody knows. This is the little car with a mind of its own—put it on any surface—table top, carton top—and off it goes—and as soon as it reaches the edge, it turns to keep from falling off! Hitting a new high in hilarity and suspense, the PUZZLE CAR makes more fun than a barrel of monkeys—send for yours today! SEND NO MONEY. Rush your order today. Remit with order and we pay postage or order C.O.D. plus postage. Special price to dealers.

$2.98 complete

BERNARD FINE CO. Inc. DEPT. PSCI
501 Sixth Avenue New York 11, N. Y.

100 PRACTICAL USES

Glider Model FLAME GUN



7 MODELS from $22 up

KILL WEEDS, crab grass, Canada thistle,—stalks, seeds and roots. Destroy brush, caterpillar nests, diseased trees, grasshoppers, chinch bugs, etc. Clear irrigation ditches, split rocks, burn tree stumps..... Sterilize poultry houses, kennels, barns. Use as portable home forge. Melt ice, thaw pipes. Safe, inexpensive. Burns only 6% kerosene—94% Air! Thousands satisfied users. Write for FREE CATALOG.....

HAUCK MFG. CO.,
82 Tenth St., Brooklyn 15, N. Y.

COMPLETE OUTFIT *TO DRILL THROUGH* CHINA, GLASS OR POTTERY

$1.00—Postpaid. Guaranteed.

Lang Lamp Company, Dept. PS, 1245 Bellevue Ave., Eau Claire, Wisconsin

Tired Kidneys Often Bring Sleepless Nights

Doctors say your kidneys contain 15 miles of tiny tubes or filters which help to purify the blood and keep you healthy. When they get tired and don't work right in the daytime, many people have to get up nights. Don't neglect this condition and lose valuable, restful sleep.

When disorder of kidney function permits poisonous matter to remain in your blood, it may also cause nagging backache, rheumatic pains, leg pains, loss of pep and energy, swelling, puffiness under the eyes, headaches and dizziness.

Don't wait! Ask your druggist for Doan's Pills, a stimulant diuretic, used successfully by millions for over 50 years. Doan's give happy relief and will help the 15 miles of kidney tubes flush out poisonous waste from your blood. Get Doan's Pills.

Copyrighted material

THESE 5 TRADES ASSURE YOU

HIGH PAY • Future Security

- **PLUMBING** Every phase of plumbing Pipe-Cutting and Threading, Lead-Wiping, Rough-in Projects on Installations, Completed Installations of entire plumbing systems Blueprint reading Estimating
- **DRAFTING** College-level courses in General Machine and Architectural Drafting, with fundamentals in Drafting Mathematics—all under graduate engineers
- **SHOE REPAIRING** From simplest repairs on boots and shoes to the finest details of reconditioning and rebuilding, under expert craftsmen
- **ELECTRICAL** Technical and shop training include Basic Electricity, Residential Wiring, Industrial Wiring General Testing and Trouble Shooting, and Appliance Repair
- **AUTOMOTIVE & TRACTOR** Applied training on latest model automobiles and tractors, including engine overhaul, transmission and differentials, carburetion generator and ignition systems engine tune up, Hydramatic and Vacamatic Transmissions, and general service

"There's Always a Demand for the Man who KNOWS!"

CHOOSE ONE OF THESE 5 LEADING TRADES

Get Out of that Rut.. Be a Skilled Tradesman! Have a Lifetime Career . Own Your Own Business and Be Secure in Your Old Age

NOW while Enrollment is still open, send for FREE information.

THE 5 DIVISIONS OF

NATIONAL TRADE SCHOOL

Dept. C 2610 Grand, Kansas City 8, Mo.

____• Plumbing ____• Drafting

____• Shoe Repairing ____• Electrical

____• Automotive & Tractor

NAME _____

ADDRESS _____

CITY _____ STATE _____

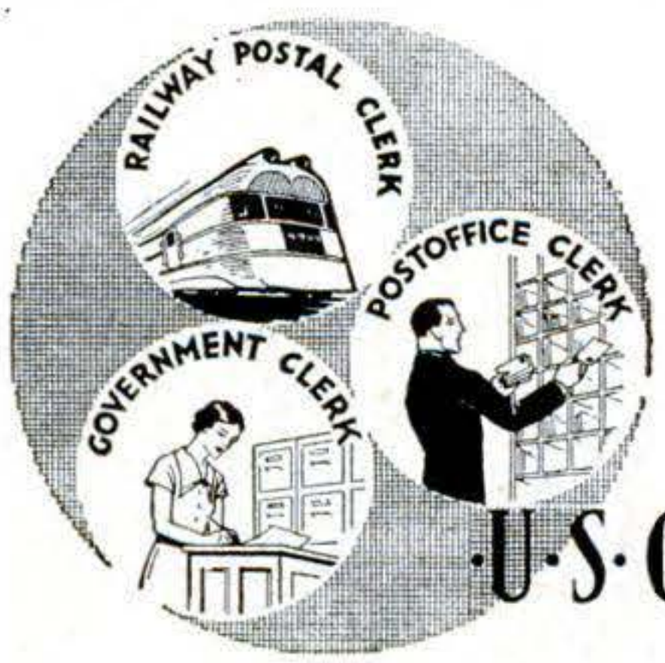
VETERAN OCCUPATION _____

Choose One of these 5 Essential Trades

Our complete courses of thorough training prepare you to go right into the field as a Qualified Tradesman at High Pay in only 34 weeks (39 in Shoe Repair). All courses under especially trained instructors with practical experience. 6 Hour Classes 5 Days a Week. Our Employment Department helps you.

VETERANS "Approved for veterans' training by the State Department of Education under Public Law 346." "Approved for veterans' training by the Veterans' Administration under Law 16."

Send Coupon for Free Information Now



WANT A U·S· Government JOB?

START AS HIGH AS $3,021.00 YEAR

VETERANS GET PREFERENCE

MEN—WOMEN

Thousands Appointments each year. Get ready immediately. Common education usually sufficient.

Mail Coupon Today—SURE

COUPON

FRANKLIN INSTITUTE
(Not Government Controlled)
Dept. B-82
ROCHESTER 4, N. Y.

Gentlemen: Rush to me, FREE of charge, list of U. S. Government big pay jobs. Now obtainable. Send me FREE 32-page book describing salaries, vacations, hours, work. Tell me how to qualify for one of these jobs.

Name.....

Address.....Vet?.....

"TOOK IN $217 FIRST 10 DAYS"

Some Make More, Some Less . . .

We Help You to Start Your Own All-Year Business, Make Big Money!

With our easily operated, highly efficient wall washer, Chas. Stelle took in $217 gross in first ten days. E. L. Goss took in more than $10,000 in one year. E. C. Taber wrote, "I made $400 gross in two weeks." And no wonder—this machine washes walls 6 times **faster** and **better** than by hand.

YOUR MONEY-MAKING OPPORTUNITY

We want more men to go into this profitable business for themselves and enjoy independence. There are customers everywhere—homes, offices, schools, churches, hotels, stores, etc. What you take in is mostly profit, for material costs are low. And there's no need to rent a shop or office. Operate your business from your home.

Lose no time. Get all facts without obligation. WRITE FOR FREE INFORMATION. Ask for Wall Washer Details at once.

VON SCHRADER MFG. CO., C-53, Racine, Wis.

Copyrighted material

INVENTORS

When you are satisfied that you have invented a matter of value—write me, without obligation, for full information as to what steps you should take to secure a Patent or Trademark.

The usual first step is to have a search of the prior U. S. Patents conducted, so that I can report to you on the question of Patentability.

PATRICK D. BEAVERS
(Formerly RANDOLPH & BEAVERS)
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

PATRICK D. BEAVERS, *Registered Patent Atty.*
937 Columbian Bldg., Washington 1, D. C.

Please send me full information on how to secure Patents & Trademarks.

Name.....

Street.....

City.....*State*.....

MAKE $ MORE MONEY

Applying or Selling

CORKSTONE

A General Purpose Magnesium Oxychloride Flooring

THE MODERN PLASTIC FLOORING

EASY TO APPLY
Here's your opportunity to get into business for yourself applying or selling Corkstone, the economical, top-grade plastic flooring. Plenty of profit. Act without delay!

Dealers & Agents Wanted

WRITE FOR DETAILS

LASTING PRODUCTS COMPANY
200 Block-S. Franklintown Rd., Baltimore 23, Md.

Mows and Trims Lawns

In One Simple Easy Operation 8¼ Lbs.

Save Time and Labor with a

MONTAMOWER

New model. New type metal handle has special device to adjust cutting height. Drive shaft now mounted on free rolling, factory lubricated, sealed ball bearings. No tired backs or aching arms. 8¼ lbs. live precision made mechanism that first gathers, then cuts smoothly a clean 16" swath through grass, dandelions, spike grass, lawn weeds. No noise or clatter. As modern and efficient as your electric razor. Cuts right up to walls, fences, trees or posts; leaves no fringes to be trimmed by hand. Cutters self-sharpening. Built to last many years. Many thousands in use. Sold direct from factory for 26 years. Costs little. Write at once for trial on your own lawn "approval offer," guarantee information and literature.

MONTAMOWER DISTRIBUTING CO.
830 Keeler Bldg. GRAND RAPIDS 2, MICHIGAN

Woo-Wee wolf whistle AUTO HORN

Reproduces "Wolf Whistle" better than any sailor. Screeches, barks, whistles, imitates siren, moves any "road hog" off the highway in "double quick plus." Attract more attention than by driving a yellow Cadillac. Operates from manifold. Installed on any car in 15 minutes. Sturdily constructed. Cleverest novelty since the use of the auto. Be the first user in your neighborhood. Dealers wanted. 6 dollars each. Order today. Ohio orders add 3% tax.

THE PROTECTUROD COMPANY—Dept. 102
4033 Windsor Road • Youngstown 7, Ohio

COMB-A-TRIM

The New Quick Trimmer

Something New! Trim your hair without any experience. It's easy! The excess hair comes off smoothly and easily by just pulling trimmer through hair like an ordinary comb. Save on hair-cut bills. . . . Trim your own hair or the whole family's. Send 59c and your Comb-A-Trim will be sent at once, postpaid.

59c

SPECIAL OFFER Send $1.00 for 2 Comb-A-Trims. Save 18c **2 for $1** 5 Extra Blades (Year's Supply) **25c**

COMB-A-TRIM CO., CAREW TOWER, Dept. J-27, Cincinnati, Ohio

HOME BARS

25 DESIGNS

HOME BARS for genial hosts. Fun to make and use. 25 designs . . . built-in, portable bars; cellarettes, only $1.00. Send currency or check today. Money-back guarantee.

HOMECRAFT PLANS, Dept. S-118, 7241 Madison, Kansas City 5, Mo.

If Ruptured

Do What Others Now Do—

Wear a Form Fitting MILLER Truss

which provides natural freedom and comfort in working, walking, playing, horse back riding, dancing, swimming or sleeping. You just cannot afford to be without this protection and convenience.

Wear two weeks then consult your physician before deciding to keep it.

Write me today for **FREE** descriptive circular. Sent in plain, sealed envelope.

FRED B. MILLER Manufacturer
Dept. P.S. Hagerstown, Maryland.

Copyrighted material

LEARN DIESEL THE QUICK, EASY WAY

THE FAMOUS HEMPHILL WAY!

Wherever Diesels are used, the name "HEMPHILL" is famous It stands for TRAINED MEN—men who *know* Diesel Many trained Diesel graduates of Hemphill Schools are successfully engaged in work where their Diesel training is "paying off." Perhaps they are assembling Caterpillar Tractors, or servicing Cummins-powered trucks, or installing and maintaining General Motors Diesels. Perhaps they are working with these and other makes of Diesel engines in trains, ships, drilling rigs, sawmills or construction equipment—but no matter what the Diesel job, Hemphill trained men have the "know how" to handle it.

Prepare YOURSELF for the great industrial swing to Diesel power which is now here Get complete details of Hemphill Diesel training now!

STUDY AT HOME—Learn Diesel AT HOME in your spare time, without interfering with your present activities Prepare for a bigger future this quick, easy way Mail the coupon below for complete details and free literature. **Or attend 34 weeks resident classes at schools listed below.**

APPROVED FOR VETERANS

AUTOMOTIVE TUNE-UP SPECIALIST TRAINING at Memphis and Los Angeles. Check coupon.

RESIDENT SCHOOLS LOCATED AT:

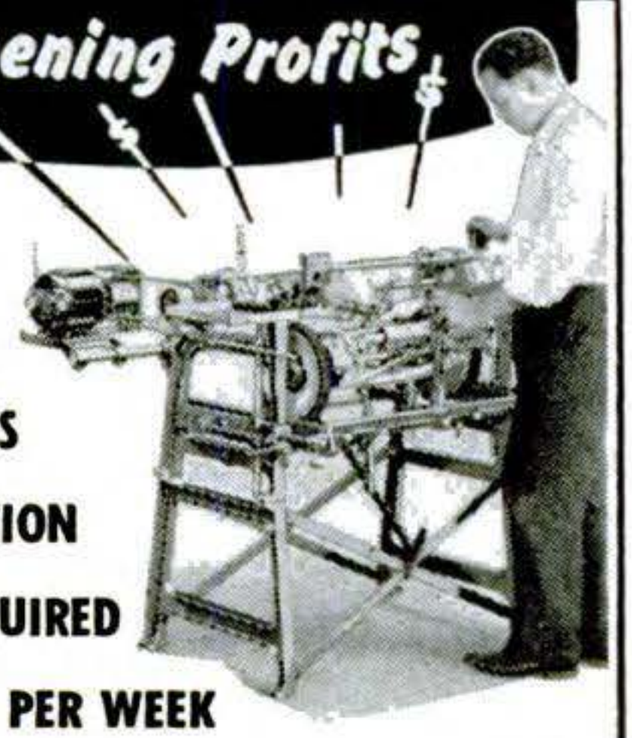
NEW YORK	LOS ANGELES	MEMPHIS
31-28 Queens Blvd.	1601 S. Western Ave.	311 S. Main St.
Long Island 1, N Y	Los Angeles 6, Calif	Memphis 3, Tenn

34 weeks practical training. If you would prefer to train at one of these three schools, indicate by check on coupon.

MAIL COUPON NOW!

HEMPHILL DIESEL AND AUTOMOTIVE SCHOOLS
Administrative Office: 1601 South Western Ave., Dept PS-58
Los Angeles 6, California
Gentlemen: Please send me FREE BOOKLET and information on your Diesel Courses.
I am interested in Home Study ☐ Resident School ☐ at New York ☐ Memphis ☐
Los Angeles ☐ (Check school desired.) Auto Tune-up ☐ L.A. ☐ Memphis ☐
Name_____ Age_____
Street_____ Zone_____
City_____ State_____
Veteran_____ Non-Veteran_____

IDEAL — For Lawnmower Sharpening Profits



PRECISION-BUILT
•
GRINDS ALL MAKES OF LAWNMOWERS
•
AUTOMATIC OPERATION
•
NO EXPERIENCE REQUIRED
•
MAKE UP TO $200 PER WEEK
•
OPERATE in YOUR OWN GARAGE or BASEMENT

Ideal Lawnmower Sharpener sharpens blades easily, speedily, accurately. Grinds reel knives to fit the straight blade perfectly. Behind Ideal's strong, sturdy construction are nearly 50 years of engineering experience. Handles maximum width lawnmowers. Get ready for the lawnmower sharpening rush now.

Send for FREE Book

The FATE-ROOT-HEATH CO.
Dept. D-4, PLYMOUTH, OHIO

Save Money FREE

KITS for Amateurs and Experimenters

RADIO CATALOG AND SUPPLEMENT

Build it yourself.

Thousands of radio values in this big book — Radios and radio phonographs, F.M., P.A., Ham Xmitters, receivers, kits, thousands of parts — whatever the job calls for Lafayette has it. And every item priced way down, to save you money!

RADIOS
KITS
HAM
P. A.

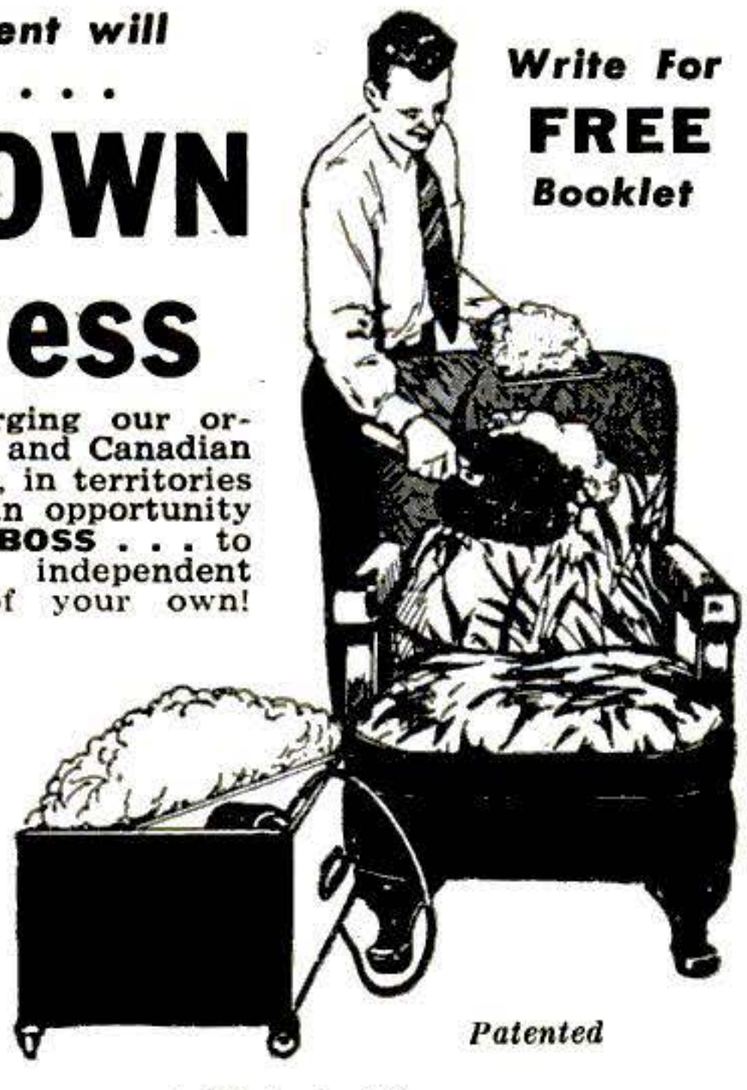
Lafayette Radio
RADIO WIRE TELEVISION, INC.
100 Sixth Ave., N. Y. 13 • 542 E. Fordham Rd., Bronx 58
110 Federal St., Boston 10 • 24 Central Ave., Newark 2, N. J.

LAFAYETTE RADIO, Dept. KE-8
100 Sixth Ave., New York 13, N. Y.
Rush catalog #88 ☐ *Flyer #C42* ☐
Name.....
Address.....
City.....Zone.....State.....

Copyrighted material

a small investment will establish you in . . .

Your OWN Business



Patented

Write For FREE Booklet

We are NOW enlarging our organization of U.S.A. and Canadian **DURACLEAN** dealers, in territories still open. Here is an opportunity to **BE YOUR OWN BOSS . . .** to become financially independent with a business of your own!

You become a fabric specialist, providing the proper cleaning and moth protection for upholstery and floor coverings. You use the proven, successful methods of established dealers. Service is rendered right **in the home,** office or public buildings without removing furnishings.

DURACLEAN Service was established **18 years ago** as an improved method for cleaning and revitalizing rugs and furniture. No harsh machine scrubbing, no soaking or shrinking. No inconvenience for your customers.

DURAPROOF makes fabrics and rugs **repellent** to moths, carpet beetles and mildew. You give a 4-year warranty of protection. These services have a waiting market . . . a big repeat business. Profits up to $15 and $20 a day on **EACH** of your service men. Write today! A letter and 16 page illustrated booklet will explain everything.

- **No Overhead Expense**
- **No Shop Necessary**
- **No Experience Needed**
- **You Learn Quickly, Easily**
- **Short Hours . . . Large Profits**
- **Service Nationally Advertised**

Don't delay! Territories are limited. Remember, just a moderate payment, easy terms, and the opportunity to become financially independent in **YOUR OWN BUSINESS!**

DURACLEAN CO., 18-5CT St., Deerfield, Illinois

VETERANS Learn WATCHMAKING

A Lifetime Career

No Age, nor Physical Limitations

YOUR OPPORTUNITY

To Lift Yourself from a Futureless Job

LEARN WATCHMAKING

and earn from the start, higher than average pay . . . easy hours . . . ideal working conditions . . . be prepared to establish your own business.

WATCH REPAIRING—JEWELRY—ENGRAVING

Always in Demand

Requests for our Graduates from Everywhere. Permanent positions (no layoffs) $75.00–$100 per week for trained men. Write today for latest FREE Catalog.

KANSAS CITY SCHOOL OF WATCHMAKING

America's Most Progressive Horological School

619 WYANDOTTE ST. KANSAS CITY 6, MO.

★ Have FUN with POCKET X-RAY!

Like STARTLING effects? POCKET X-RAY is a picture-panic! When you turn the little disc the surprise is GUARANTEED! Works slick as magic—custom-made for parties and get-togethers! Just $1 prepaid, or 3 for $2.50. (Write for wholesale prices).

STAR SPECIALTY CO.

DEPT. PS 3 BUTLER, PENNA.

WHY PAY MORE? ALUMINUM PIPES

$1

Imported briar bowl, hard rubber stem, air cooled aluminum shank. No filters required. Check or money order, we pay postage. C. O. D. orders filled on request. **Write for FREE catalog of pipes and cigars.**

SATISFACTION GUARANTEED OR YOUR MONEY BACK

***Eddie* THE CIGAR MAN**

Dept. P-2, 1094 Bedford Ave., Brooklyn 5, N. Y.

Become a Doctor of PSYCHOLOGY

Win the degree of Ps.D. Teach the secret of contentment, happiness. Solve mental worries. Experience the revelation of truth. Chartered college. Individual help. Write for FREE book. **COLLEGE OF UNIVERSAL TRUTH, 5153-A North Clark St., Chicago.**

COLOR AT A PRICE YOU CAN AFFORD TO PAY

"PHOT-O-CHROME" 2½ x 3½

"SPARKLING COLOR PRINTS"

Made From Any Ansco, Ektachrome or Kodachrome Transparencies **50c** (unmounted)

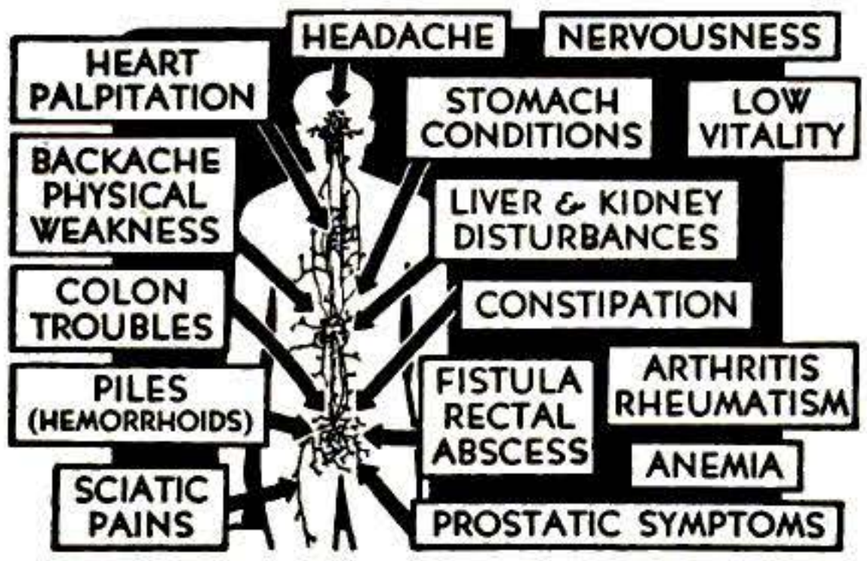
5 x 7 . . . 2.50 8 x 10 . . . 4.00

CLEVELAND COLOR SERVICE

3974 EAST 131st STREET CLEVELAND 5, OHIO

Get Facts About Fistula — FREE

NEW BOOK—Explains Causes and Latest Treatment



Illustrated, authentic 40-page book on Fistula, Piles (Hemorrhoids), related ailments as shown in diagram and colon disorders is yours FREE. Send postcard to Thornton & Minor Clinic, Suite 549, 926 McGee St., Kansas City, Mo.

Copyrighted material

Learn BUILDING

AT HOME • All Blue Print Building Plans, Specifications, Lessons Furnished

FIND OUT ABOUT TRAINING AND OPPORTUNITIES FOR YOU IN BUILDING

Established in 1904, Chicago Technical College offers you thorough, practical training in Building, by home-study. Mail coupon for free information. See what this Course has done for others, what it can do for you. Read what Chicago Tech graduates say about their work, earnings, success. Learn the rewards awaiting you as a trained builder—and how quickly, easily you can get started. Simply MAIL COUPON TODAY in an envelope or paste on a penny postcard.

Earn more money as a building tradesman. Prepare for advancement and increased pay as a building foreman, superintendent, inspector, estimator, material buyer or salesman. Train to be a building contractor, have your own money-making business in this busy, prosperous building field.

More than 19 million new homes needed in U.S., say experts. New building now at rate of one million homes a year, plus 200,000 commercial buildings, plus expanding farm building construction.

Mail coupon today. FREE book tells how you learn Building Construction—How to Read Blue Prints, and Estimate Building Costs—at home in your spare time. Learn modern construction methods and materials, how to lay out work and direct all building operations. This is the training needed for rapid advancement to higher-paid jobs, or your own successful building business.

MAIL COUPON NOW

CHICAGO TECHNICAL COLLEGE
E-158 Tech Bldg., 2000 S. Michigan Ave.,
Chicago 16, Illinois

Mail me FREE building Lesson with information about big opportunities in BUILDING and how I can train at home.

Name.....Age.....

Address.....

City.....Zone.....State.....

CHICAGO TECHNICAL COLLEGE
E-158, Tech Building, 2000 South Michigan Ave.
Chicago 16, Illinois

NONE BETTER AT ANY PRICE!

PAINT YOUR CAR WITH KAR-WIPE

NEW AUTO ENAMEL SENSATION

GUARANTEED 2 FULL YEARS $1.95

WIPE IT ON! NO SPRAYING! NO BRUSHING!

No Lap Marks
No Masking
No Streaks

YOU CAN DO A FACTORY LIKE JOB

One Quart Covers Average Car With Two Gleaming Coats. A Glowing Professional Finish!

Not a streaky wax or polish. KAR-WIPE is the new miracle high lustre auto enamel that is so easy to use. Anyone can do a professional looking job quickly.

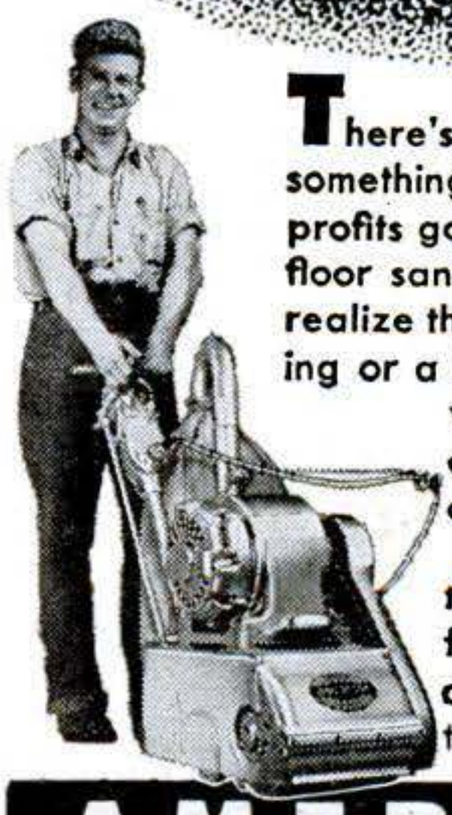
Almost anyone can get high-gloss job that looks like a Professional finish. KAR-WIPE does the trick! Easy to apply! No brush! No masking! Simply WIPE IT ON with the applicator that we give you FREE. Get a factory-like finish that's GUARANTEED against chipping, cracking, peeling, fading when simple directions are followed. Dries dust free quickly. In newest colors.

SEND NO MONEY! Order one or more quarts today. Just mail postcard Pay postman plus C.O.D. upon delivery. Send remittance, save postage.

SEND NO MONEY! ORDER Kar-Wipe TODAY!
In Black, Grey, Firey Red, Brewster Green, Washington Blue, Maroon . . . $1.95 per qt.

KAR-WIPE CO. Dept. S-5, 828 S. 18th St., St. Louis, Mo.

Be Your Own Boss



There's a great feeling to being in something for yourself, where all the profits go into your own pocket. American floor sanders make it possible for you to realize this ambition without special schooling or a big investment. Begin small and work up to as large an enterprise as you desire . . . It all depends on your ambition to get ahead.

Ask for "tell-all" booklet entitled "Opportunities in Floor Surfacing". Use coupon and enclose 25 cents in coin or stamps to cover handling.

AMERICAN FLOOR SURFACING MACHINE CO.

532 So. St. Clair St. • Toledo 3, Ohio

Gentlemen:
Enclosed find 25c in stamps or coin for booklet "Opportunities in Floor Surfacing," telling me how I can start my own floor sanding business.

Name_____

Street_____

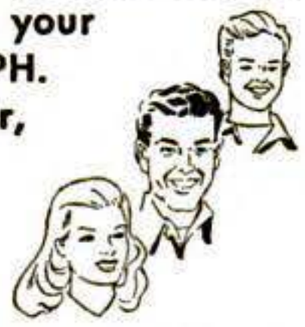
City_____State_____

Copyrighted material

POWERBIKE

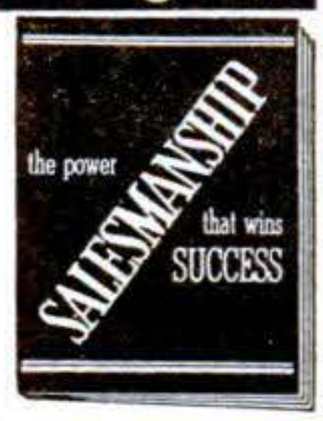
gets you there safely and economically

The motor is in the rear, mounted low to aid balance and handling. No grease to rub off on your legs, no hot fumes blowing in your face. 100 miles per gallon, 30 MPH. 1½ HP fan cooled engine, kick starter, automatic clutch, fits any man's or woman's balloon-tire bike. See your dealer or write direct.
TERRITORIES AVAILABLE.



SAGINAW PRODUCTS CORP. • SAGINAW, MICHIGAN

SALESMEN— *earn more money!!*



Now—make *real* money in selling . . . prepare quickly for today's new money-making opportunities.

LaSalle's new plan trains you rapidly, thoroughly, at home. Low cost—easy terms. Over 200,000 salesmen trained by LaSalle for all lines . . . and big corporations have paid over a million dollars for use of same sales principles now available to you.

FREE 48-PAGE BOOKLET— "Salesmanship, the Power that Wins Success"—tells today's big opportunities, and how *you* can prepare for large earnings in this profitable profession. Write for your copy today—without cost or obligation.

LASALLE Extension University, 417 So. Dearborn St.
A Correspondence Institution Dept. 583-LS, Chicago 5, Ill.

Learn ORNAMENTAL HORTICULTURE

A thorough, constructive home training for employment or advancement in Nursery Operations, Park Supervision or maintenance, Landscape Designing or Landscape Gardening. My 3 way Plan shows you how to start your own business, get a better job, or earn extra money in spare time. Send for Free Book. APPROVED FOR VETERANS.

NATIONAL LANDSCAPE INSTITUTE
Dept. PS-5, 310 So. Robertson • Los Angeles 36, Calif.

TRI-STATE COLLEGE

B.S. Degree in 27 months in Engineering (7 branches), Bus. Admin., Acctg. and Sec. Science. Graduates successful. **64th year.** Enter Sept., Jan., March, June. Write for catalog. **558 College Ave., Angola, Ind.**

HOW TO CUT RAFTERS

New vest pocket book gives lengths, side cuts, plumb cuts, deductions. For all rafters for any building from one inch to forty feet wide. Gives numbers to cut on square. Also degrees for same cuts for Radial Saws. All standard pitches from 1/8 to 5/8. Just open book to pitch page and there are your lengths, side cuts, etc. Anyone who knows what a jack rafter is can frame a roof if he has this great book. Price one dollar. ($1.25 in Canada). **Builders' Topics, Dept. S, Lock Box 828, Seattle, Washington.** CARPENTERS, PLUMBERS, PLASTERERS, ELECTRICIANS, ETC. subscribe for Builders' Topics, the monthly magazine for HE-MAN CONSTRUCTION WORKERS. Only $1.00 per year. (In Canada—$1.25). Sample copies 25c.

ORDER NOW! JULY 4th FIREWORKS

470 PIECES $4.98 WHOLESALE PRICE

ACTUAL RETAIL VALUE $13.55

YES SIR! 470 OR MORE NOISE AND BEAUTY PIECES FOR ONLY $4.98. Magnificent assortment—each a knock-out! Gorgeous, colorful, NEW displays—intricate artistic effects—all merchandise brand-new! For only $4.98 you'll get—Sparklers, Salutes, Red Trail Blazers, Roman Candles, Two-Shot Repeaters, Magic Black Snakes, Cones, Dago Flash Bombs, Three-Shot Automatics, Magic Flames, Airplane Flares, Chinese Rockets, Red Rocket Sky Whistle Bombs, "T-N-T" Flash Salutes, Z-Brand Chinese Firecrackers, Happy Chinese Firecrackers, FREE PUNK!

Order this wonderful over-470-Piece Fireworks Bargain TODAY! Send money order, bank draft, or certified check for $4.98. Do NOT send cash. NO C.O.D. orders! PRINT name and address plainly. Give name of your Express office. Fireworks cannot be mailed. All shipments by Express, F.O.B. at Fort Worth.

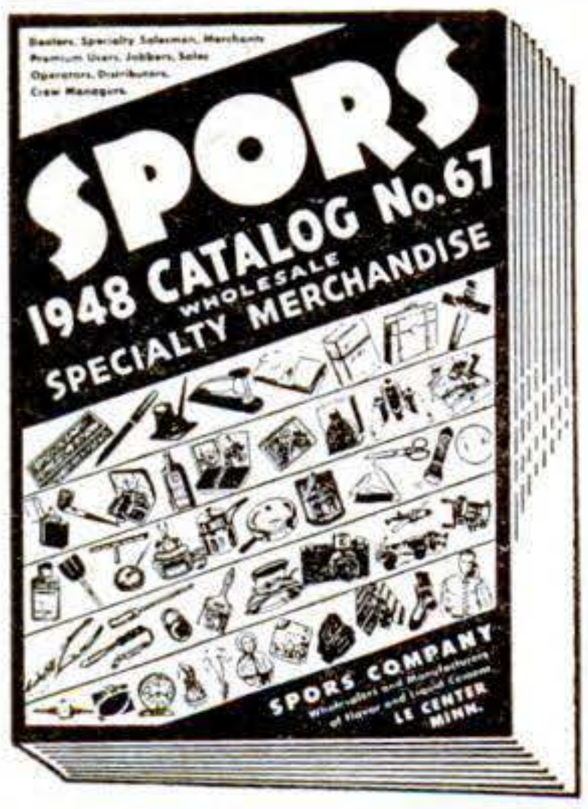
ASK FOR FREE CATALOG
MANY OTHER ASSORTMENTS

Stars and Stripes Fireworks Co.
P. O. BOX 486, DEPT. PS
FORT WORTH 1, TEXAS
NOT INTENDED TO OFFER FOR SALE IN LOCALITIES WHERE REGULATIONS PROHIBIT

SHOE REPAIR
OFFERS BIG INCOME
LEARN IN 12 WEEKS TIME

In 12 weeks time you can own your own shop or earn big income as skilled shoe repairman. Growing demand everywhere at top wages for men who know how. We teach you quickly by actually working on shoes and modern machines. Costs nothing under G.I. Bill of Rights. We help you get big pay job or start your own shop in 12 short weeks. School open to all from 18 to 60 years of age. FREE BIG 16 PAGE BOOK explains everything. Send for your copy today.

MODERN SHOE REBUILDING SCHOOL, *Established 1927*
2937 Belmont Ave., Chicago, Ill. RUSH POSTCARD TODAY!



6000 SMASH HITS— IN 324 PAGE Wholesale Book

Dealers, agents, salesmen and jobbers, you will find this book bulging with Tested Money Makers. Latest catalog shows average price reductions about 21% on many items. A guarantee of satisfaction stands back of every purchase you make from us. 25c brings you this latest 1948 wholesale catalog of Tested Sellers. You may take credit for the 25c on your first order. In that way the Book will not cost you any money. Get your copy now, before supply is depleted.

SPORS CO. 3-48 Smith St. Le Center, Minn.

Copyrighted material

Paint Your Car for ONLY $3.95

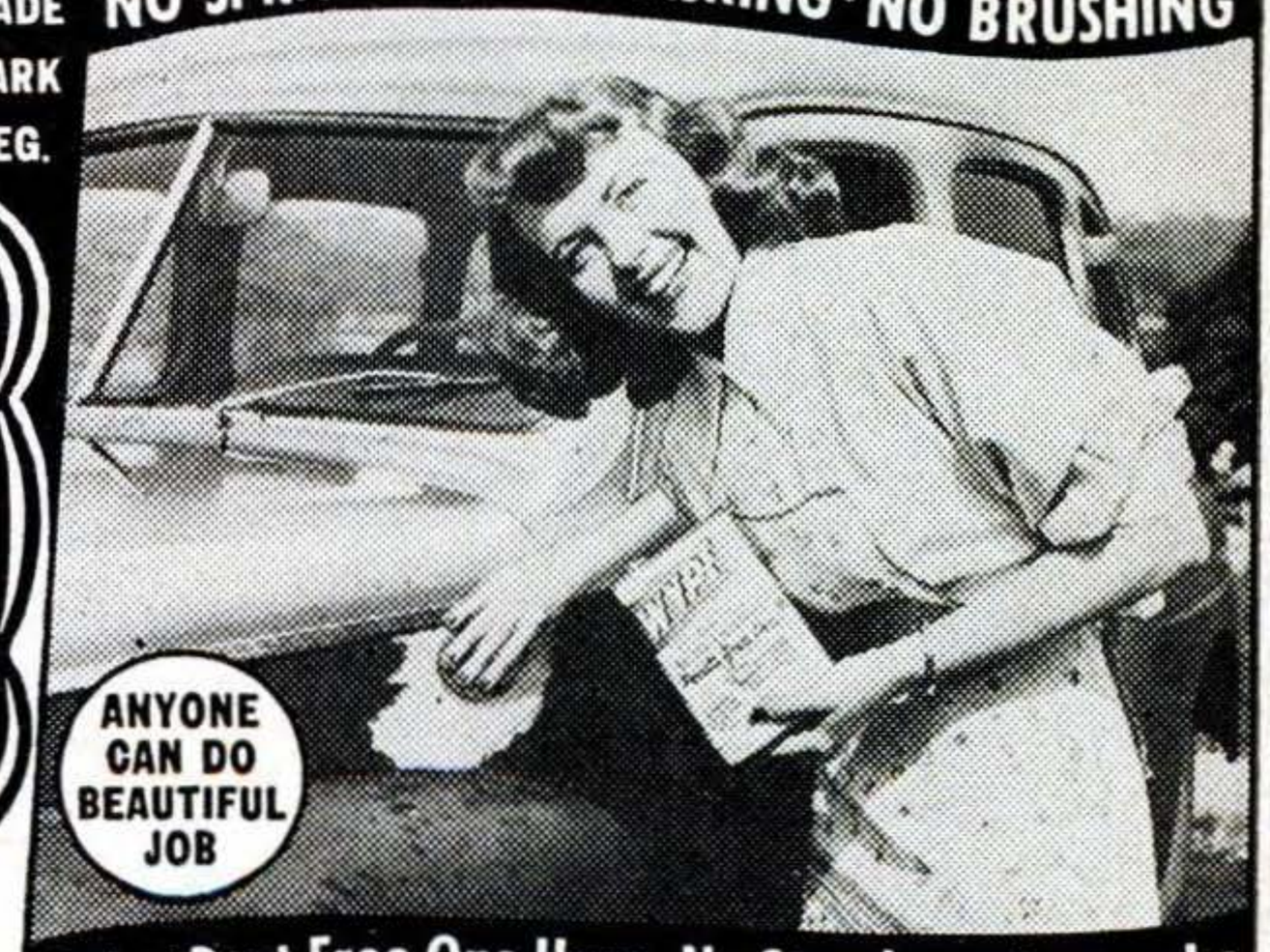
2 FULL COATS — ONE QUART DOES ENTIRE JOB

WITH **WYPE** TRADE MARK REG.

NO SPRAYING · NO MASKING · NO BRUSHING

AMAZING NEW BRUSHLESS AUTO ENAMEL

You *JUST WIPE ON* with a POWDER PUFF instead of Brushing or Spraying



Dries Dust Free One Hour · No Streaks or Lapmarks

Get Beautiful Mirror Like Finish That Looks Like Spray Job!

At last! Practically anyone can now paint his car with WYPE! No previous car-painting experience necessary. You get a beautiful high-gloss job that gives you an expensive finish such as is sprayed on by Professional Auto Painters—at a fraction of regular cost! With WYPE you need **NO** BRUSH, **NO** SPRAY, **NO** MASKING! Just **WIPE ON** with Powder Puff—which we furnish at no extra charge. You get a brilliant, glossy finish that is truly "factory-like." No streaks. No lap-marks. Guaranteed for TWO years not to crack, peel, chip or fade, if simple directions are followed. Takes about an hour to apply. Dries dust-free in an hour. WYPE comes in nine most popular shades including those on newest model cars. Goes over any other color, lacquer or enamel.

MOST POPULAR COLORS

Black — Brewster (dark) Green
Maroon — Jewel (light) Green
Red — Washington (dark) Blue
Gray — Monticello (light) Blue
Sun Beige (light) Tan

$3.95 Per Quart

SEE YOUR DEALER or ORDER DIRECT SEND NO MONEY · Get WYPE Today!

If your dealer can't supply you, just send us a postcard. We'll ship C.O.D. Just pay mailman for Wype, plus postal charges. Or send remittance with order and WE pay postage.

You're SURE You Are SAFE when You Paint with WYPE HERE'S WHY!

TESTED BY U. S. Testing Co., Inc.

Leading Scientific Testing Laboratory

Report No. 87496
Jan. 5, 1948

and found to conform to the claims and guarantee of the Wype Corporation.

No higher or more rigid standards are set by any Testing Laboratory. United States Testing Company conducts scientific tests for the world's foremost organizations and is accepted as a leading authority on such tests.

For Your Protection

Before you buy any automobile paint, ask for proof that it has passed tests by a nationally known testing laboratory. Remember the value of your car! You can TRUST Wype.

2-YEAR GUARANTEE

We Guarantee WYPE against cracking, peeling, fading or chipping for two years after application, if applied according to directions furnished. Your money cheerfully refunded if WYPE does not live up to this Guarantee.

COPYRIGHT 1948, WYPE CORP

APPLY in ONE HOUR — DRIES to GLISTENING PROFESSIONAL FINISH

WYPE is a new Miracle Enamel for Autos. It is NOT a wax or polish but a hard high lustre ENAMEL finish! With WYPE, ANYONE can do a beautiful job! Order a quart to paint your car or to get started in this BIG-MONEY Business!

NO STREAKS OR LAPMARKS LOOKS LIKE SPRAY JOB

Win $2,500 Cash!

$5,000 Cash Prizes In All

Win $2,500 cash writing best letter telling your experience with Wype!

Just 3 Easy Steps

1. Write letter: "My Experience with Wype."
2. Enclose one of following: Sales check or receipt you got when purchasing Wype; or powder puff used to paint your car; or reasonable facsimile of Wype can. (When you order direct, we send official entry blank—dealers also have blanks.) 3. Mail to us.

$5,000 CASH PRIZES

1st Prize . $2,500 Cash!
2nd Prize . . $500 Cash!
3rd Prize . . . $250 Cash!
5 Prizes, ea. . $50 Cash!
100 Prizes, ea. $10 Cash!
100 Prizes, ea. $5 Cash!

Anyone May Win!

Letters considered best by judges get prizes! Judges' decisions final. Duplicate awards in case of ties. No entries returned. All entries must be postmarked before midnight June 30, 1948, and received before July 14, 1948. Full details at dealers or write us.

Some of the FAMOUS DEPARTMENT STORES that Sell WYPE

VISIT or PHONE THE STORE IN YOUR CITY...

If you live in one of the cities shown here, it will be more convenient to buy from your favorite department store. Ask your dealer! Leading merchants everywhere sell WYPE.

Akron: M. O'Neil Co.
Baltimore: May Co.
Baton Rouge, La.: D. G. Rosenfield Co.
Buffalo, N. Y.: J. N. Adam & Co.
Chicago: Goldblatt's 15 Department Stores (Goldblatt's Department Stores, also, at Joliet, Ill., Hammond, Ind., Gary, Ind., South Bend, Ind.)
Cincinnati: Fair Store Co.
Cleveland: May Co.
Dallas: Sanger Bros., Inc.
Denver: May Co.
Detroit: People's Outfitting Co.
Ft. Wayne: Wolf-Dessauer Co.
Ft. Worth: W. C. Stripling Co.
Hackensack, N. J.: Packard-Bamberger
Houston: Foley's
Indianapolis: Wm. H. Block Co.
Kansas City Mo.: Jones Store Co.
Los Angeles: May Co.
Louisville: Kaufman-Straus Co.
Memphis: B. Lowenstein & Bros.
Milwaukee: Ed. Schuster & Co., Inc.
Minneapolis: Donaldson's
Montgomery: Montgomery Fair Store
New Orleans: Maison Blanche Co.
Newark, N. J.: Bamberger's
New York: Gimbel's
Philadelphia: Lit Brothers
Pittsburgh: Kaufmann's
Richmond, Va.: Miller Rhoads, Inc.
St. Louis: Famous-Barr Co.
St. Paul, Minn.: The Golden Rule
San Antonio: Joske's of Texas
San Diego: Whitney's
Syracuse, N. Y.: Dey Bros. & Co.
Toledo: Lion Dry Goods Co.
Washington, D. C.: Lansburgh & Bro.
Youngstown, O.: Strouss-Hirshberg

WYPE CORP. Dept. 17-E 2214 DOLMAN ST. ST. LOUIS 4, MO.

Copyrighted material

GOVERNMENT JOBS

START AS HIGH AS $3,021.00 YEAR

VETERANS GET PREFERENCE

MEN—WOMEN

Clerks
Statistical Clerks
Postoffice Clerks-Carriers
Railway Postal Clerks
Customs Inspectors
Stenographers-Typists
Many Other Jobs

GET READY IMMEDIATELY

Common Education Usually Sufficient

Mail Coupon TODAY—SURE

COUPON

Franklin Institute
(Not Government Controlled)
Dept. B-81
ROCHESTER 4, N. Y.

Gentlemen: Rush to me, FREE of charge, list of U. S. Government big pay jobs. Send FREE 32-page book describing salaries, vacations, hours, work, etc. Tell me how to get one of these jobs.

Name .....

Address ..... Vet?.....

MAKE HOLLYWOOD STYLE CEMENT POTTERY, birdbaths, benches, coffee tables, stucco-rock, rustic garden walks, etc. Many more. Color concrete with chemicals. Start with small capital. 10¢ brings sample, pictures, details.

HOLLYWOOD CEMENTCRAFT
8527-B Wonderland Ave. Hollywood 46, Calif.

LEARN ACCOUNTING SALESMANSHIP SECRETARIAL WORK

Assure Your Future Now!

Hill's, one of America's outstanding Business Schools, offers you the opportunity to enter one of the three fields acknowledged to hold substantial earnings and a secure future. Our FREE book, "Through Hill's to Success," tells how and where the best positions are found and how you can qualify for them by study at home or in our resident school. We have thousands of successful graduates and maintain nationwide employment service. G. I. Approved.

FREE WRITE TODAY

USE THIS HANDY COUPON

HILL'S EXTENSION SCHOOL Dept. PS-5
AND BUSINESS UNIVERSITY,
619 W. Main St., Oklahoma City 2, Okla.
Please send me your Free book, "Through Hill's to Success."

NAME _____

ADDRESS _____

CITY _____ STATE _____

FIREWORKS

CHINESE FIRE CRACKERS

1 Bundle or 1280—1½" Crackers..... **$4.50**
1 Bundle or 1600—1½" Crackers..... **5.35**

BALLOONS—LATEX RUBBER

No. K 10, per gross..... **$1.50**
No. K 20, per gross..... **3.00**

Write Dept. R for Wholesale Quotations.
Send Remittance with Order.

UNITED FIREWORKS MFG. CO., INC.
Dayton 7, Ohio

BUILDING CONSTRUCTION

with composition cement and cheap wood builds good 3-room house for $250; barns low as $50.00. 100 illustrations and 100 money and labor saving suggestions. Get this newly revised and enlarged, guaranteed book before you build. **$1.00,** postpaid. **SHEET METAL COTTAGES** and other buildings. Several new methods. Illustrated instructions. **50c.** **FURNITURE OF COMPOSITION.** Cement, sawdust, asbestos, etc., scrap wood, metal, etc. Illus. **50c.** **SHOP MACHINES FROM OLD AUTO PARTS:** Over 60 described. **50c.** **HOME MFG. ENTERPRISE.** 50 home shop projects. Ills., **50c.**
Special: All five booklets described above, $2.00 postpaid.

HOME INDUSTRIES, 1318 So. 30th Ave., Dept. S5, Omaha 5, Nebr.

LEARN WATCH *and* CLOCK REPAIRING

Start training now for a better paying job or your own profitable business. Qualified Watch Makers are in demand . . . Unlimited opportunities. Intensive practical training by experienced watch makers. Approved for veterans. Write for full details. Indicate if Veteran.

SCIENTIFIC SCHOOL OF WATCH MAKING, Dept. PS-5
3923 San Fernando Road Glendale 4, Calif.

SURPLUS *FIELD JACKETS*

Just about the lowest price you'll find for this popular Army jacket! 100% warm wool lining, water-repellent with adjustable hip-strap. Ideal for work, dress, sports—men or women. Reconditioned, ready for many months' serviceable wear. Send no money, just state size and pay C.O.D. plus postage, or send payment and **we** pay postage!
Send for free clothing catalog!

GUILD—B 120 E. B'way, N. Y. 2, N. Y.

YOU CAN BE AN ELECTROPLATER

Be your own boss or work for big pay. Make money while you learn at home in spare time. Interesting, uncrowded field. Plate with chrome, nickel, silver, gold, etc. Money making trade secrets furnished. *Send postcard for **FREE** idea booklet today!*

HYDE SCHOOL OF ELECTROPLATING
432 F Street, Room 522, San Diego 1, California

Take a Deep Breath . . . and Your Tie Mysteriously Rises! Lift Up a Drink . . . and Your Tie Comes Up Too . . .

WITH THE NEW **FAMOUS FLIP-UP TIE!**

Loads of laughs—just waiting for your order! It's the famous FLIP-UP TIE—funniest thing in town. You can make your tie pop up instantly, lie flat in a second—you control the speed. Startle your gang into howls of laughter next time they get together—get the FLIP-UP—it's the life of the party!

SEND NO MONEY
Rush your order today, remit with your order and we pay postage or order C.O.D. plus postage.

$1.98 complete

SATISFACTION GUARANTEED
SPECIAL PRICE TO DEALERS

BERNARD FINE CO., Inc.
Dept. P-S-T-1, 501 Sixth Avenue, New York 11, N. Y.

Copyrighted material

SAFE • EFFICIENT • SIMPLE

KUT-RITE *(Patented)* LAWN MOWER SHARPENER

Keeps Mower Cutting Right

3 Popular Sizes—Retail Prices: 14"—**$1.40,** 16"—**$1.50,** 18"—**$1.60.** Replacement Emery Cloths **50c each.** Plus Postage from Milwaukee, Wis. Weight 2 lbs. each.

AGENTS WANTED
Write for Details

ACCURATE SHARPENER MFG. CO.
Dept. PS1 **Milwaukee 12, Wisconsin**

HOT WATER, DAY OR NIGHT

ONLY $3.00 POSTPAID

Now you can have hot water quickly for your workshop, shaving, for washing stockings or a few clothes. Just plug in light socket and follow directions. 5-year service guarantee with each heater. Operates on 110 A.C. or D.C. Satisfaction guaranteed or money back. **No C.O.D. orders, please.**

AMSCO COMPANY
Dept. P. S. **Le Center, Minn.**

GET INTO CARTOONING!

Let **Hartman** teach you cartooning, gag writing at home. Learn by mail from a professional! Send Name, Address for **FREE DETAILS.**
Hartman Studios, 2776 California Court, Lincoln 8, Nebr.

Burn-Rite Wood Burning Detachable Pen

Approved by Underwriters
Only one of its kind. Write for complete list of casting and wood burning sets.

$1.50 EACH POST PAID

RAPAPORT BROS. INC.
Dept. PS-5, 1830 S. Washtenaw Avenue **Chicago, Illinois**

BEARINGS

Bore	O.D.	Type	Price, each
.250	.750	Ball	$0.15
.1575	.6299	Ball	.15
.1895	.500	Needle	.15
.1895	.625	Needle	.15
.2495	.625	Needle	.15
1"	1¼"	Needle	.15
1¾"	3"	Ball	1.25

All Brand New—Minimum order 10 bearings.

BENJAMIN SALES CO.
8774 Linwood Ave. **Detroit 6, Mich.**

Fafnir, N. D. S. K. F., Torrington Schatz & Norma

PRECISION JEWELERS SCREW DRIVERS

Complete Set of 8 for Every "Hobbyist"

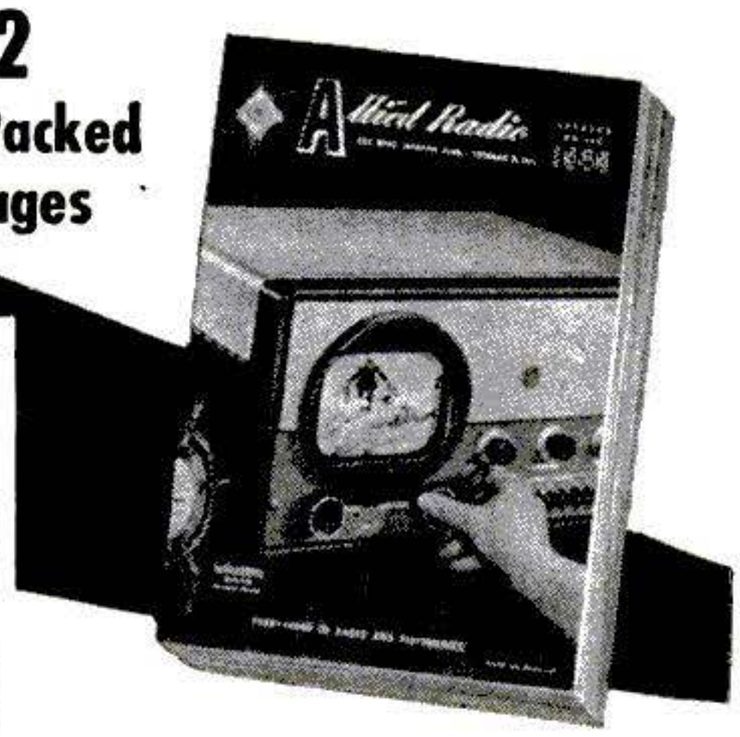
At last—a complete set of precision screw drivers to meet the needs of every model builder. Not a miniature but the same type set used by U. S. Navy for precision instruments and watches during the war. Brass knurled handles, hexagon heads, finest tempered steel blades. Sizes 2-9. Never before a set of this quality and precision at such a low price. Your money back if not satisfied. C.O.D. $2.00 plus postage or send $2.00 and we pay postage.

PINE WATCH CO., Rm. 40, 29 Eldridge St., New York 2, N. Y.

FREE *get it now*

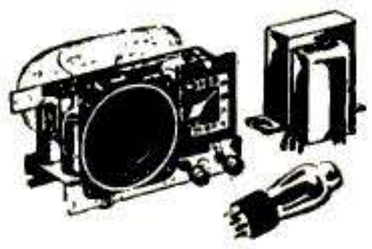
ALLIED'S NEW 1948 RADIO CATALOG!

172 Value-Packed Pages

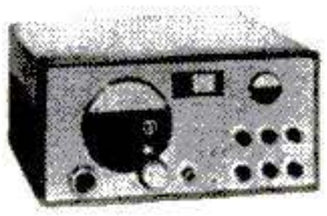


EVERYTHING IN RADIO AT LOWEST PRICES

TELEVISION AND NEW HOME RADIOS



SERVICE SUPPLIES
BUILDERS' SUPPLIES



AMATEUR GEAR

SOUND SYSTEMS

Radio's Great Buying Guide

Send today for your FREE copy of Radio's Leading Catalog! It's the preferred Buying Guide for Servicemen, Dealers, Engineers, Soundmen, Amateurs, Builders and Experimenters. Shows everything you want in Radio and Electronic equipment—all the newest releases—complete, highest quality stocks at low, low prices that save you money on every purchase!

World's Largest Stocks!

You'll find *everything* in the new 172-page ALLIED Catalog—television receivers, latest home radios and radio-phonos, Ham receivers and station equipment, test instruments, public address equipment, new builders' kits, thousands of parts, tubes, tools, radio books, diagrams. Get the speedy, reliable service and expert help you want from ALLIED—Radio's Largest Supply House! Be sure to send today for your FREE copy of ALLIED'S new 1948 Buying Guide!

ALLIED RADIO

ALLIED RADIO CORP.
833 W. Jackson Blvd., Dept. 7-E-8
Chicago 7, Illinois

FREE CATALOG

☐ Rush FREE 1948 ALLIED Catalog

Name.....

Address.....

City.....Zone.....State.....

Copyrighted material

Now! Broadcast through your Radio with this New WIRELESS MICROPHONE!

No Connections — No Hookups of any kind—Completely Wireless

BROADCAST IMMEDIATELY!

Broadcasts through any radio indoors—outdoors—anywhere. It's a completely self-contained wireless transmitter — a marvel of modern electronic engineering. Talk into it —sing into it—and *without plugging in — without connecting wires* your voice comes booming through any radio set within a 50-foot radius. Use it for fun at gatherings, parties, etc. *Ultra-Mike is not a toy*—it's a rugged, scientifically engineered transmitter in mike form that gives high fidelity — performance.

Hear baby while you're in another room

Loads of Fun — and Practical, Too

Ultra-Mike is highly efficient over a full 50-foot range. It is completely self-contained, with its own tube and long life (easily replaceable) battery. No hook-up or connections are needed. Carry it with you — talk as you walk — and you'll marvel at its fine modulation — its full-bodied volume—the clearness with which your voice is reproduced.

ORDER TODAY. SEND NO MONEY.

Just send name and address and we'll send C.O.D. plus postage, or send $10.00 and we ship postpaid. Don't delay.

MAIL MART INC.
Dept. EE 70
230 Grand Street, New York 13, N. Y.

CANVAS COVERS Waterproof tarpaulins, war surplus (Used), perfect condition. Originally made for tents. Approx. 5'x8'. Two buttoned together make approx. 80 sq. ft. Complete with buttons attached. Suitable for use as canvas dams, hay covers, truck covers, machinery and equipment covers, etc. Packed in bales 40 each, priced 40 covers, **$1.00** ea; 15 covers, **$1.50** ea. Less than 15, **$1.75** ea. All FOB, Kansas City.

AMERICAN SUPPLY CO.
329 W. 5th Dept. P. S. Kansas City, Mo.

PRESTO! ANYONE CAN MASTER GLAZE

Car Owners! Meet Master Glaze—the sensationally different luster for new and used cars! Not a wax—not an oil polish —not a paint!—nothing that "smears" over the surface.

MASTER GLAZE is a unique discovery—a creamy liquid —quick and easy to apply! Gives a hard, glass-like surface. Even gasoline cannot dull it! Lasts six months to a year! Amazing luster—beautiful, sparkling clean and brilliant! Doesn't finger-mark—doesn't smear! A match box full glazes an entire car. Seals the pores—protects! NOTHING LIKE IT!

AGENTS
An unusual opportunity! Quick, flashy demonstrator. Big profits. Good territory. Write today!

FREE SAMPLE
Just send your name and address to
MASTER GLAZE CO., 7720-658 W. Harwood Ave., Milwaukee, Wis.

2-Way Communication WITHOUT BATTERIES Up To 1 MILE!

AMAZINGLY LOW COST!

NOTHING ELSE LIKE IT!
2-way communications up to 1 mile with sound power. Set of two specially adapted headphone and microphone combinations, plus 25 ft. of wire. Simply add more wire for greater distance. All ready to use! ONLY $2.95

WON'T WEAR OUT
Made to rigid Signal Corps standards. Self-powered; no batteries; no parts to wear out. Lasts a lifetime!

$2.95 COMPLETE
SEND CHECK OR MONEY ORDER

Shipped postpaid anywhere in U. S.
FM SPECIALTIES INC., Dep't. S-5
851 Hegeman Ave. Brooklyn 8, N. Y.

IF C. O. D. PAY POSTMAN $2.95 PLUS POSTAGE CHARGES.

DRAINS CELLARS, WASH TRAYS CIRCULATES OIL

Pumps 1800 GPH 300 gal. 30' high, uses ⅛ to ⅓ HP motor. Will not clog. **$6.50**

Postpaid if cash with order.
(Add 50c for west of the Mississippi.)
Thousands in use since 1936
LABAWCO PUMPS, BELLE MEAD 3, N. J.

DEVELOP RUGGED STRENGTH!

Strong Men's Club of America offers FREE Membership!

Send for your personal membership card and Strength Secrets. No dues! No obligations! Many valuable privileges! Send name, address, age, on penny postcard.

JOE BONOMO Strong Men's Club of America
Director, (Dept. PS-5) 1841 Broadway, N. Y. 23, N. Y.

NEWEST OTTAWA LOG SAW

SELF-PROPELLED — MOVES ANYWHERE on OWN POWER

World's fastest Log Saw. Powerful 6 H-P air-cooled motor. Attachments for sawing down trees, buzzing limbs, post hole digging and pulley for belt jobs. Big demand for wood, pulp, posts. Make big money sawing wood this easy way. Low factory-to-user prices. Nothing like it. FREE details.

OTTAWA MFG. CO., 7-801 Pine St., Ottawa, Kansas

BUILD YOUR OWN ZEOLITE WATER SOFTENER

You can do it inexpensively with only a wrench and a little spare time. Same Zeolite process as used by other leading water softeners. Send $1 for easy-to-follow directions and list of materials. (Materials available locally or from us.) Your money back if not satisfied.

LAKE REGION MFG. CO., 4184-B Xenwood Ave., Minneapolis 16, Minn.

LEARN TO PLAY THE ACCORDION

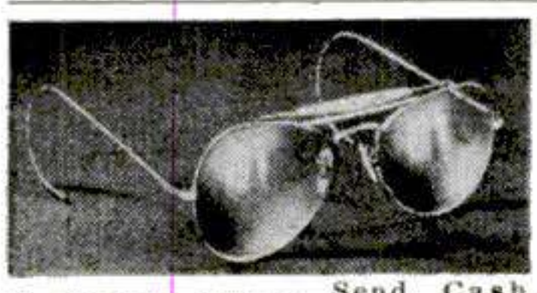
THRU THE "SEE & HEAR" SYSTEM

This unique system of study enables you to be "Your Own Teacher". The course consists of recorded lessons and instruction method. The "SEE & HEAR" system is an easy, pleasant and effective way of learning to play the Accordion.

Write for complete details. **Dept. S**

O. PAGANI & BRO., INC.
289 BLEECKER STREET • NEW YORK 14, N. Y.

Copyrighted material

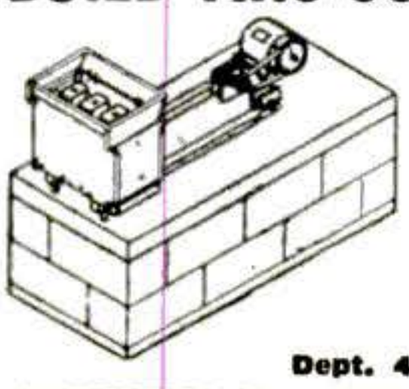


WERE $8.50
NOW $3.00
with leatherette case

Send Cash, Check or Money Order—We Pay Postage or C.O.D. plus postage!

SENSATIONAL SALE!
Aviation Type SUNGLASSES
24K GOLD PLATED
SAME TYPE AS USED BY ARMED FORCES
LIFETIME WRITTEN GUARANTEE. Ground and Polished Glass. Approved by the Bureau of Standards, Wash., D. C.
A. L. SMITH, Dept. P
124 East 25th Street, New York 10, N. Y.

BUILD THIS CONCRETE BLOCK MACHINE



Sell blocks; or build your home, garage, barn, or filling station at 1/3 cost by making and laying your own blocks.
This simple machine which you can build yourself at a cost of $15 (excluding motor) will make a block in 30 seconds using only one form. Mass production can be achieved by a new simple method of removing blocks which allows two to four forms to one vibrator. Power driven concrete mixer plans also. Send dime for details and "How to Make and Lay Blocks" folder.
U-BUILD-IT SERVICE
Dept. 4-A, 206 West Wilder St., Tampa 3, Florida

TENTS Small & large, new & used. Army surplus. Also canvas covers, hammocks, canvas cots, clothing, paints. Lowest prices. Free circular.
MORSAN SALES
10-15P 50th Ave. Long Island City 1, N. Y.

Wanted MEN AND WOMEN to be PHOTOCOLORISTS
Learn this fascinating trade and make between $2.00 and $4.00 an hour in your spare time. Interesting, easy-to-learn course includes all materials and information needed to set up business as a free-lance colorist. ★ WRITE TODAY!
vander Bie School 1258 S. GRAMERCY PL. 8 LOS ANGELES 6, CALIF.

FILLS HOLES, CRACKS, DENTS, GOUGES
Master craftsmen use these finest fillers

DURATITE
2 oz. Tube
Postpaid -25¢
WEBB PRODUCTS CO., 232 S. "G" Street, San Bernardino, Calif.

BE A CLERK *all my life?*
NOT ME!!

Of course you say you won't.

But you may be unless you do something about it.

Hoping and wishing won't get you a better job and more money.

You must prepare for that step ahead—be ready to make promotion come.

We have helped thousands of ambitious men and women get ahead in the business world—perhaps we can help you.

At least you should investigate. It may be the turning point in your life to a better job and more money. So send the coupon without delay. Check the field of your choice and we'll send you without obligation the requirements and opportunities in that field.

LASALLE Extension University
A Correspondence Institution
417 S. Dearborn St., Dept. 583-R Chicago 5, Ill.

I want to know whether you can help me get ahead in the field I have checked below. Send me your free 48-page booklet and full information about your home-study training in that field.

- ☐ Accounting
- ☐ Bookkeeping
- ☐ C.P.A. Coaching
- ☐ Law: LL.B. degree
- ☐ Salesmanship
- ☐ Stenotypy (Machine Shorthand)
- ☐ Business English
- ☐ Effective Speaking
- ☐ Industrial Management
- ☐ Business Management
- ☐ Traffic Management
- ☐ Foremanship

*Name*_____ *Age*_____

*Position*_____

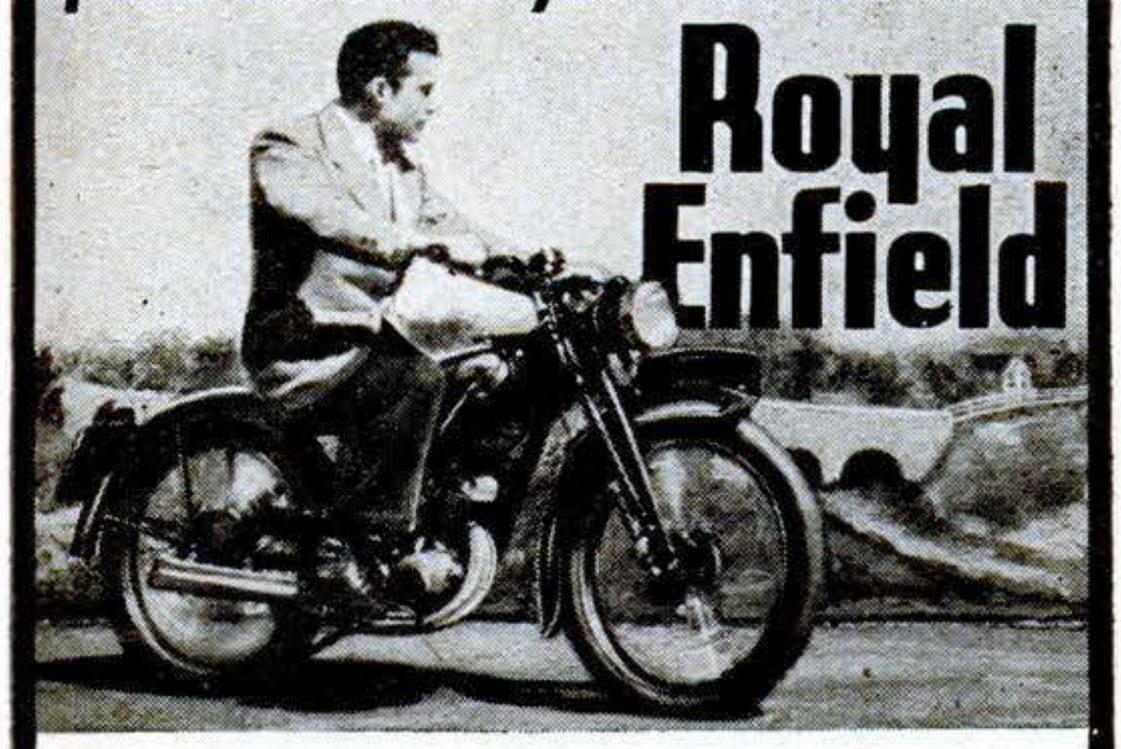
*Address*_____

*City*_____ *Zone*____ *State*_____

Copyrighted material

Everything you want for outdoor pleasure when you ride a . . .

Royal Enfield



FAMOUS ENGLISH LIGHTWEIGHT MOTORCYCLE RUNS

100 MILES ON A GALLON OF GAS

Up and go—with the rugged new Royal Enfield popular Model R.E. Style, safety, flexibility, 125 c.c. 2-stroke, single cylinder engine, 3-speed gears; 45 m.p.h. Write today for folder "S", for complete details. Also 350 c.c. and 500 c.c. models are immediately available.

Dealer inquiries given prompt attention.

WHITEHALL DISTRIBUTORS, Inc.

1385 Commerce Avenue, New York 61, N. Y.

CARTOONING

Learn cartooning, drawing, sketching, etc., 31 lessons, 600 illustrations, including drawing paper, pens, pencils. $1.00 complete. Order now!

AMERICAN STAMP CO., Dept. C-4111, Wilmington 99, Del.

LOOK TALLER INSTANTLY!

WEAR HITE-BUILDERS IN YOUR OWN SHOES

Want more respect? . . . more opportunities? Then increase your height INSTANTLY with Davis Hite-Builders. Slip them inside your own shoes. Invisible . . . comfortable . . . easy to wear. Made to last for years. Amazingly low-priced!

SEND NO MONEY

Rush name, address, and shoe size today. Pay postman only $1.95 plus few cents postage for your pair of Hite-Builders, mailed in plain package. If not delighted with immediate result, just return them and we'll refund your money at once. Or send $1.95 now and save postage. Same guarantee . . . of course. Order today, look *TALLER* next week!

Only **$1.95 A PAIR**

DAVIS MFG. CO.

DEPT. K-341, LOVELAND, OHIO

The HAMSTER MANUAL

By Albert F. Marsh

READ THE HAMSTER MANUAL

The most complete guide book on the successful breeding and raising of Syrian Golden Hamsters. Tells all about this new, fast growing, profitable and interesting hobby industry. Reveals all the secrets of the largest breeder of these delightfully profitable pets and laboratory animals. 34 Chapters chuck-full of information gleaned from actual experience as a breeder. Twenty Pages of illustrations. A few subjects are: history, housing, three methods of breeding, easy to get feeds, sexing, fertility vitamins, handling, educational, scientific projects, crating, profits and selling, where to buy and how to sell hamsters. Sent postpaid for $1.00.

Albert F. Marsh, 1524 Basil St., Mobile, Alabama

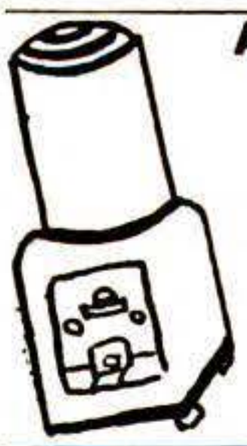
GIANT

Astronomical Telescope

100 diameters magnification. (10,000 area magnification) 3 inch diameter steel main tube 50 inches long. Brass focusing tube. Tripod 6 feet high. Equatorial mounting. Ready to set up and use. Full power and clear vision guaranteed. Price $15.00. 20% deposit on C.O.D. orders.

DEPT. BT, SUFFOLK SCIENCE SERVICE, MANORVILLE, N. Y.

"NO EXPORT ORDERS ACCEPTED"



A PENNY POSTCARD MAY CHANGE YOUR FUTURE . . .

Get full information on the coin-operated vending machine industry. Start with a few machines and build a wonderful future. We'll give you complete advantage of our "know-how." Send for Free Booklet Today—**No Routes Sold!**

PIONEER VENDING SERVICE

ADDRESS ALL MAIL TO DEPT. PS

461 SACKMAN ST. • BROOKLYN 12, N. Y.

EYE-GLASSES *by MAIL*

Send No Money!

16-Day Trial Offer

NEWEST STYLES

NEW LOW PRICES

FREE Scientific Sight Test Chart and Catalog. Write today.

U.S. EYE-GLASSES CO. 1557 MILWAUKEE AVENUE Dept. 5-42, CHICAGO, ILL.

EXCITING FILMS

Extraordinary and unusual 8-16mm. Silent and Sound Films to thrill your Home Movie Audiences.

For Sample Film and Special List send only 10c to . . .

EXCITING FILMS 1071 EL CENTRO HOLLYWOOD 38, CAL.

WINFLOW

"LOOK IT'S NEW"

Noiseless Fan Blades. More air than ever. Now all air units can be quiet. More efficient. Build a fan, change blades on your own. All sizes—1001 uses. PATENTED. Write for information.

WINFLOW NOISELESS FAN BLADE CO.

1972 S. Division Ave. Dept. PS Grand Rapids 7, Michigan

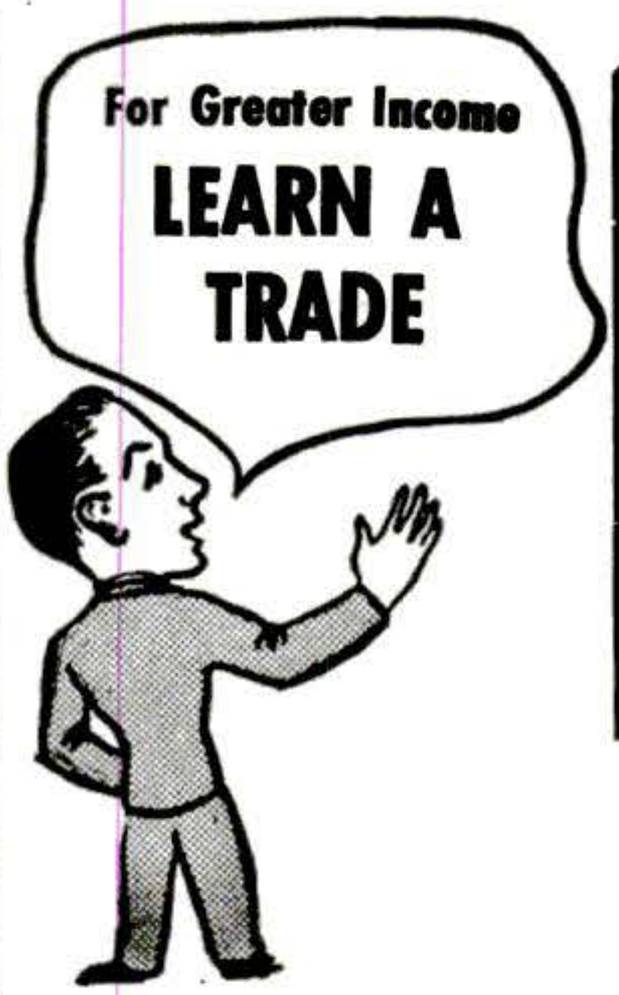
Free Sample!

Be the first to sell amazing, new GLOW IN THE DARK house numbers, switch plates, pictures, decals, religious articles, etc., etc. Represent a large manufacturer. Wonderful opportunity. BIG PROFITS. Write at once for FREE SAMPLE.

MADISON MILLS, Dept. E-5.

303 Fourth Ave., New York 10, N.Y.

Copyrighted material



✓ Auto Mechanics
✓ Refrigeration Air Conditioning
✓ Body-Fender Repair
✓ Electricity Electronics
✓ Diesel Engines
✓ Radio Servicing
✓ Building Construction

The years ahead are going to be big. Grow with them. Prepare now to get into a great, growing industry. Train with C.T.I.— a Nationally Known School. Get the benefits of our efficient Placement Service whether you want a better job or business of your own. You can come directly to our big, well equipped shops, located only a block from the shores of Lake Michigan—or you can begin your training at home by C.T.I.'s SHOP-PROVED HOME TRAINING METHODS. Fill out coupon—mail it today for big, illustrated FREE booklet.

VETERANS!

C.T.I. courses are approved under the G.I. Bill. Just Mail Coupon, we will handle all details. (Low tuition, easy terms if you are not a veteran.)

FREE BOOKLET

Commercial Trades Institute
Dept. E1-5
1400 W. GREENLEAF
CHICAGO 26, ILL.

FILL OUT · CUT OUT · MAIL TODAY!

FACTS FREE FOR MEN WHO WANT TO GET AHEAD

COMMERCIAL TRADES INSTITUTE, Dept. E1-5
1400 W. Greenleaf, Chicago 26, Ill.

Send free illustrated Brochures and other information about the field I have checked below.

☐ Refrigeration and Air Conditioning ☐ Automotive Mechanics
☐ Electricity ☐ Diesel Mechanics ☐ Body & Fender Rebuilding
☐ Radio Servicing ☐ Building Construction

Name _____

Address _____

City _____ State _____

☐ Veteran ☐ Non-Veteran

AGENTS 300% Profit — SIGN LETTERS

For Store Fronts and Office Windows. Anyone can put them on. Free Samples. Liberal Offer to general agents.
METALLIC LETTER CO., 441 N. Clark, Chicago 10

10¢ EACH — LITTLE BLUE BOOKS

Send postcard for our free catalogue. Thousands of bargains. Address:
HALDEMAN-JULIUS CO., Catalogue Dept., Desk M-2464, GIRARD, Kansas

---

1948 SENSATION! YOUR DRILL WILL POLISH & SAND
WITH THESE ATTACHMENTS

Ready to slip into chuck of any drill — **SIMONIZE YOUR CAR IN ONE HOUR**

This Flexible Lambs Wool Polishing Attachment 7" Polishing Surface

POLISHER Polisher Complete $3.00 + Sander Complete $2.00

Polish or Sand Your Furniture — Silverware, Wood Work, Floors, etc., with this Flexible **SANDER**

$5.00 complete for both. We pay all charges. C.O.D. ORDER ACCEPTED ON $1 DEPOSIT

+ 1 EXTRA LAMBS WOOL BONNET
+ A GENERAL SUPPLY of ASSORTED SANDPAPER

Also Supplied with a **Black & Decker Drill** With All the Attachments Pictured Above Complete For **$22.50**

C.O.D. Orders Accepted on $1.00 Dep. You Pay Charges

Sand evenly with a new "FAST METHOD" changing sandpaper: No screw or Hole in Sandpaper. Complete with instructions How to apply Sandpaper & Clean Polishing Bonnets.

JONRICH COMPANY 112 W. 42nd St., N. Y. 18, Dept. PS

FREE Sample Of New PLASTIC Shows How To Make Leather and Leatherette LIKE NEW!

MAGICALLY CHANGES CLOTH TO IMITATION LEATHER

SAVE MONEY - TIME AND EFFORT by renewing Luggage—Leather Covered Furniture—Golf Bags—Auto Seat Covers—Restaurant Furniture, Booths or any Leather or Leatherette item with new plastic discovery called Leather-New. Coat cloth or cloth covered items such as Glider Cushions, Tarpaulins, Porch Furniture, Etc. and make them look and wear like they were leather. Spreads easily with brush or spray gun—leaves NO BRUSH MARKS. Simple Acids, Caustics and Alcohols do not stain this finish—It is sun and mildew proof. Stays Fresh and Clean as long as real leather. Comes in all standard colors. Just mail coupon for Free sample of Leather-New coated material which shows effects.

OWN A PROFITABLE LIFETIME BUSINESS

Cash in on big profits to be made in this new business. Profits up to $700.00 monthly possible, renewing booths and furniture for bars, restaurants, grills, movie houses, etc. Mail name and address on 1c postcard—I'll show you how. Jack Edwards, Sales Mgr.

LEATHER-NEW PRODUCTS, Leather-New Bldg., 4723 Troost, Dept. S-1, Kansas City, Mo.

JUST MAIL COUPON
No Obligation

Leather-New Products, Leather-New Bldg., 4723 Troost, Dept. S-1, Kansas City, Mo.

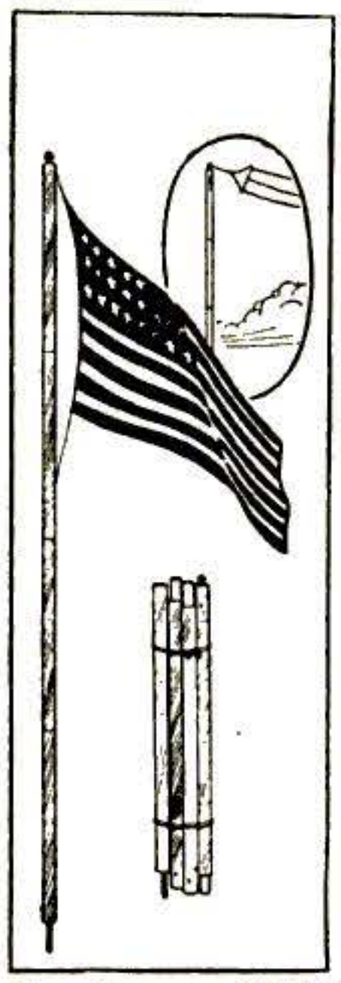
Name .....

Address .....

City ..... State .....

Fill Out--Mail Today

Copyrighted material



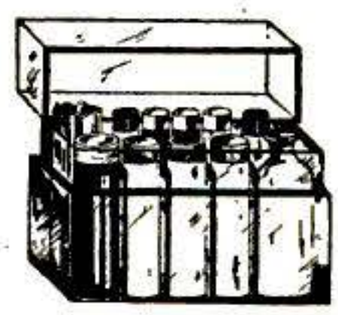
16 Foot Aerial and
FLAG POLE

This sturdy, weather resistant, flag pole takes only two minutes to assemble. Made out of specially processed hardwood plywood, it is divided into four sections which quickly telescope out to full 16 foot length. Spike on bottom supports pole in ground. Can be used as flag pole, aerial or combination of both. Weighs only 7 lbs. Original cost approx. $48.00. **$4.95** COMPLETE

SLEEPING BAG

Brand new, 100% wool, comes complete with carrying bag and hood. Weighs only 3 lbs. Has removable inner lining and convenient zipper. **$4.75** Complete

CHEMISTRY SET



Made for Chemical Warfare Division for testing water, etc. Complete set with chemicals, test tubes, full instructions. Packed in attractive lucite box, with cover and dividers. **$1**

WE PREPAY POSTAGE. Send check, cash or money order. One dollar deposit on all C.O.D.'s.

15 PIECES

WYN CASTLE COMPANY

221 So. Los Angeles Street, Dept. PS-38, Los Angeles 12, Calif.

WHY PAY MORE?

SEND THIS AD WITH ORDER

EVERY TIRE GUARANTEED
98% NON SKID, ORIGINAL TREAD
TRIPLE INSPECTED DEMONSTRATORS

Positively Not Re-caps!

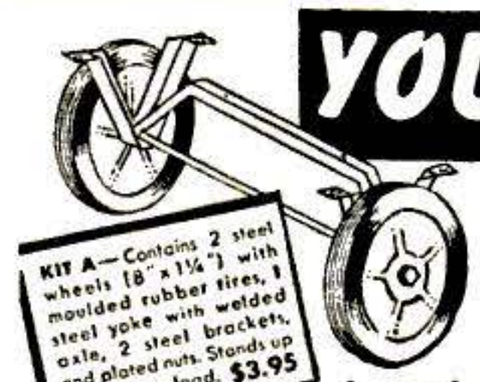
600-16 ..	$6.35	700-15 ..	$7.15
650-15 ..	5.35	700-16 ..	7.65
650-16 ..	6.95	750-16 ..	9.65

600-20	$8.55	900-20	$17.55
650-20	9.55	1000-20	17.55
700-20	12.55	1100-20	17.55
750-20(8)	12.55	32x6(8)	12.55
750-20(10)	13.55	32x6(10)	14.55
825-20	17.55	34x7(10)	14.55

750-20 MILITARY 8 PLY $15.95
900-16 MILITARY 8 PLY $9.45

WRITE FOR PRICES ON OTHER SIZES
½ million tires shipped to satisfied customers. Trial will convince you. Mail Orders. Rushed on Receipt of Check or Money Order.

STANDARD TIRE
834 N. Broad St. Phila. 30, PA.



YOU CAN BUILD anything on wheels!

KIT A—Contains 2 steel wheels (8" x 1¼") with moulded rubber tires, 1 steel yoke with welded axle, 2 steel brackets, and plated nuts. Stands up to 1000 lbs. load. $3.95

KIT B—Contains 2 steel wheels (5½" x ¾"), moulded rubber tires, 1 steel yoke with welded axle, 2 steel brackets, and plated nuts. Stands up to 475 lbs. load. $2.95

Build your own soapbox racers, wheelbarrows, toy wagons and carts, utility trucks, bike trailers, etc. with the new

PALMER COMPLETE WHEEL KIT

Everything complete: 2 sturdy, steel, molded rubber tired wheels, bright red baked enamel finish; 2 steel brackets; 1 steel yoke, welded axle; rustproof; plated steel nuts; easy to assemble, complete instructions. Stands up to 1000 lb. load.

Send check or money order. Shipments F.O.B. Cleveland 9, Ohio.

FULL MONEY BACK GUARANTEE

CONNIE-BERT CO. 8115 Clinton Rd., Cleveland 9, Ohio

LEARN LEATHER CARVING

Home study course prepares you for this interesting and profitable hobby. Many students earning as much as $3.00 an hour in spare time carving billfolds, belts, handbags, saddles, etc. Complete with instructions, designs and individual analysis of your work. **Send for valuable catalog containing many helpful and profitable suggestions**

BAIRD'S SCHOOL OF LEATHER CARVING, 1212 South Bonnie Brae, Los Angeles 6, Calif., Dept. B

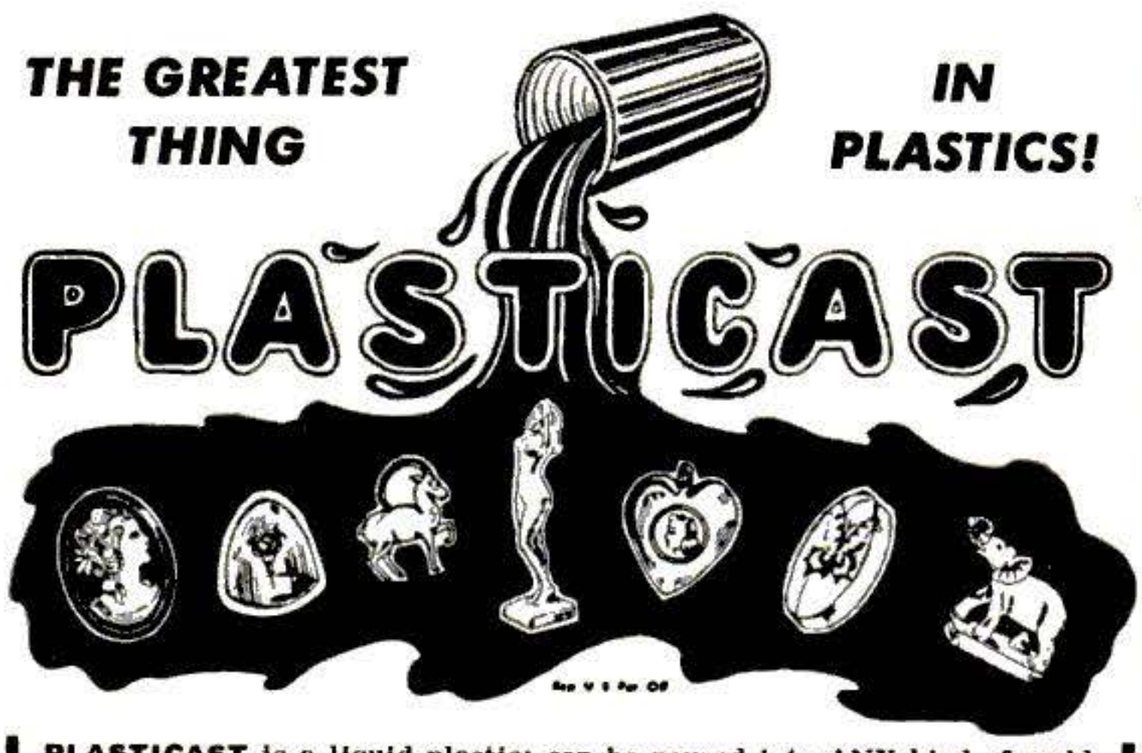
SUIT YOURS AS A BONUS

And Big Money in Spare Time, Too

We want you to wear this fine made-to-measure suit! Make it yours by sending a few orders, and earn BIG CASH PROFITS in spare time. Your suit will help you get more orders with scores of rich, quality fabrics, tailored-to-measure to newest styles. Also Ladies' Tailored Suits—complete line. Write today for FREE SAMPLES. No experience, no money needed. For quick action tell us about yourself.

J. C. FIELD & SON, Inc.
Harrison and Throop Sts., Dept. E-1721, Chicago 7, Ill.

THE GREATEST THING IN PLASTICS!



PLASTICAST is a liquid plastic; can be poured into ANY kind of mold or container. Hardens in a few minutes into a transparent solid, clear-as-glass, tough-as-steel plastic! *As easy as pouring water out of a glass!* No tools or machinery required. Ideal for imbedding flowers, butterflies, photos, souvenirs, and for making beautifully brilliant jewelry, gems, displays, fishing lures, magnifiers, lenses, knick-knacks and novelties. Easily cast into sheets, rods or blocks. ANY shape, ANY color. **EVERYTHING FURNISHED** including molds for making **PENDANT HEARTS, ENCHANTED GARDENS, MAGNIFYING GLASSES,** etc., make dozens of attractive and valuable articles! For FUN or PROFIT, start TODAY. C.O.D. orders accepted with $1.00 deposit. Postpaid U.S.A. & Canada only.

COMPLETE MASTER OUTFIT—$3.50

PLASTIGLASS

Make Beautiful, Colorful Ornaments, Jewelry, Butterflies, Flowers, Birds, Tropical Fish, Corsages and Novelties simply by bending wire and dipping into **PLASTIGLASS!** No heat, catalyst or tools required. Complete outfit for making hundreds of remarkably beautiful glass-like novelties, only **$4.00 ppd.**

FREE SPECIAL OFFER

A very attractive and useful novelty made with one of our plastics given absolutely free with every one of our catalogs! Catalog lists hundreds of new materials for making **MOLDS** and **CASTINGS** with Liquid Plastics, Liquid Ivory, Liquid Marble, Wax, Latex, Metal, Castwood, etc. Big selection of rubber molds. Price of catalog only 10c coin or stamps.

PLASTICAST CO. (Dept. A)
5961 Madison St. Chicago 44, Illinois — *We have no retail store—order by mail only.* — P. O. Box 987 Palo Alto, Calif.

COMBAT JUDO

Fiercest fighting technique known. Learn trick knock-outs, police tactics, and the art of Defense and Attack. Expert instructions in THREE volumes with 200 photographs and illustrations. Complete . . **only $2.25**

VARIETY HOUSE
Box 46-AC Wall St. Sta., New York 5, N. Y.

12 lbs. SURPLUS RADIO PARTS $2.00

A gold mine of parts for repairmen, amateurs, and experimenters . . . sockets, condensers, resistors, transformers, coils, hardware, wire, etc., etc. An outstanding bargain in **usable** parts! Send $2.00 cash, check or M.O. today!
(Pay small express charges on receipt.)

ELECTRONIC DISTRIBUTORS, Inc. Dept. S-4 620 W. Randolph St., Chicago 6, Ill.

Copyrighted material

$9.95 TAKES ALL THREE BIG BARGAINS

1. AUDIO AMPLIFIER. Undreamed of value. Uses 6V6's. Has 4 microphone inputs brought to jacks at rear panel. Various output impedances available at rear panel connections. Steel case with chrome handles. 9" long x 9" high x 6" deep. Tubes included. New in original carton. Shipping weight 15 lb. SUPER SPECIAL—$4.95 while supply lasts.

2. RADIO HEADSETS. Latest supersensitive type with rubber earpieces. Every pair guaranteed perfect. $.59 per pair OR 3 PAIRS FOR $1.00.

3. HOME WORKSHOP AT BARGAIN PRICE. Accurate and precise 2 speed guaranteed hobby lathe, the essential machine for the home workshop. Sturdy enough for light production work or factory standby service. Supplied with 56" of belting for connecting to any available electric motor or power take-off, such as on a jeep or tractor. Also included in this unbelievable offer are such accessories as a ½" drill chuck with specially hardened tool steel jaws, a 4" electric furnace high speed grinding wheel, a cotton buffing wheel with a large supply of buffing compound, and a 4" steel wire scratch brush. Your cost $6.00. Sole export agent. Distributor inquiries invited.

ORDER NOW—DON'T DELAY—NO C.O.D.s

BUFFALO RADIO SUPPLY Dept. 4M 219 Genesee St. Buffalo 3, N. Y.

Made to U.S. Army Specifications!

16-JEWEL

ELGIN

$19.95

Sturdy 16-Jewel ELGIN men's wrist watches. Water repellent. Sweep second hand. Stainless Steel back. Unbreakable crystal. QUALITY! American made. Fully reconditioned with ONE YEAR GUARANTEE! Made for the U. S. Army Air Corps. **They HAD to be good. SEND NO MONEY.** Simply pay postman $19.95 plus 10% tax and postage on delivery. Cash orders sent postpaid. Limited supply. **UNITED PRODUCTS CO.,** 7941 S. Halsted St., Dept. RES-620. Chicago 20. Ill.

KINKADE GARDEN TRACTOR

and Power Lawnmower

A Practical Power Plow and Cultivator for Gardeners, Suburbanites, Florists, Truckers, Nurserymen, Fruit Growers.

Easy Terms - Write Today

Catalog Free

American Farm Machine Co.
1072 33rd Ave. S. E. Minneapolis, Minn.

TRAIN NOW FOR AN

AVIATION CAREER

IN SUNNY SOUTHERN CALIFORNIA

MAXIMUM TRAINING IN MINIMUM TIME

Specializing in AERONAUTICAL ENGINEERING and MASTER AVIATION MECHANICS since 1929 . . . America's Finest Aeronautical Institute . . . 7000 successful graduates . . . MAKE MORE MONEY . . . MAIL COUPON TODAY. APPROVED FOR VETERANS.

Board and Room now available.

Without obligation, send free catalogue with full information.

PS-5

NAME_____ AGE_____

ADDRESS_____

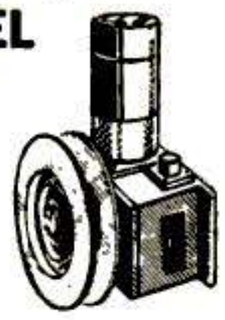
CITY_____ ZONE_____ STATE_____

CAL-AERO TECHNICAL INSTITUTE

GRAND CENTRAL AIR TERMINAL • GLENDALE 1, CALIFORNIA

WAR SURPLUS AND OTHER BARGAINS

POWER DRIVEN ANTENNA REEL



⅛ HP, G. E. Motor—12-24V. Removable 6" Reel. Cam worm gears, bevel gear. Solenoid clutch. In gear only when current on. Operates clockwise or counter clockwise. Ideal for power fish line, opening or closing doors, auxiliary power take-off. Can be used as buffing machine or for dozen of other uses. New. Weight 6 Lbs. **$4.50** each.

CLIPS: Rubber lined, aluminum, hundreds of uses in any shop. Assorted sizes, all new. 5 Doz. **$1.** – 500 **$5.**

SEND CHECK, MONEY ORDER or CASH

MICROMETER

Chrome plated, precision engineered and carefully tooled to give long life . . .

all new. 0-1" capacity, **$2.25.** 1-2" capacity, **$3.50** Each.

HIGH SPEED DRILL BITS

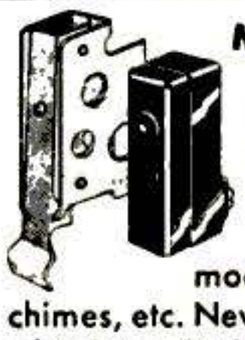
Like new! Original value over $16.00. 25 assorted sizes & lengths **$2.50.**

ROUTER BIT ground for BORING BAR: High speed steel, right hand, single flute, ¼" bit, straight shank for ½" chucks. Ideal for every machine shop.

Like new, original cost about $10 ..... 3 for **$2**

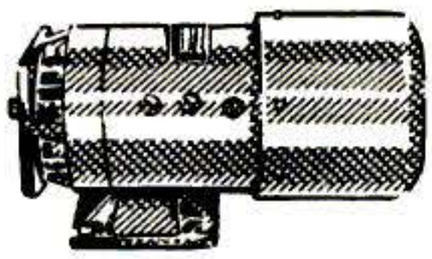
25% DEPOSIT REQUIRED ON C.O.D. ORDERS

SCOOP! We have been awarded 100,000 genuine briar pipes by Quartermaster Corps. Assorted shapes and sizes. All popular makes. Set of 6, **$3.50**



MICROSWITCH: Type Z - 2"x1"x ¾". Used open or closed. For automatic contacting-light, sound, model train systems, chimes, etc. New..... 3 for **$1.**

Aluminum Spring Actuator to fit above Microswitch..... 3 for **$1.**



EMERSON 3 HP MOTOR: AAF Type D50. This motor can also be used as generator when driven by another motor. Ideal for portable welder, etc. 28 Volts, D.C. Compound, 3800 RPM, 115 AMP, windings glass insulated, blower cooled, shaft dimension 5/8". Weight 27 Lbs. New. **$13.95** each

ALL PRICES F.O.B. CULVER CITY, CALIF.

GOGGLES: Designed for paratroopers. Great for motorcycling, speed boating, hot-rod driving, etc. (One polarized and one clear) All new..... 2 pair for **$1.00.**

4 in 1 SCREWDRIVER: 3 smaller sizes fit into 6" overall size. Fine steel bits. Solid brass handles. All New. Each ..... **$1.**

TRANSFORMER: Jefferson Electric step up or step down transformer. Input, primary 110-117 Volts A.C. Output, from 5 Volts to 650 Volts. Suitable for use with war surplus gadgets, heater relays, radio test filaments, electric trains, house chimes, etc. Weight 10 Lbs. New. **$7.95** Each.

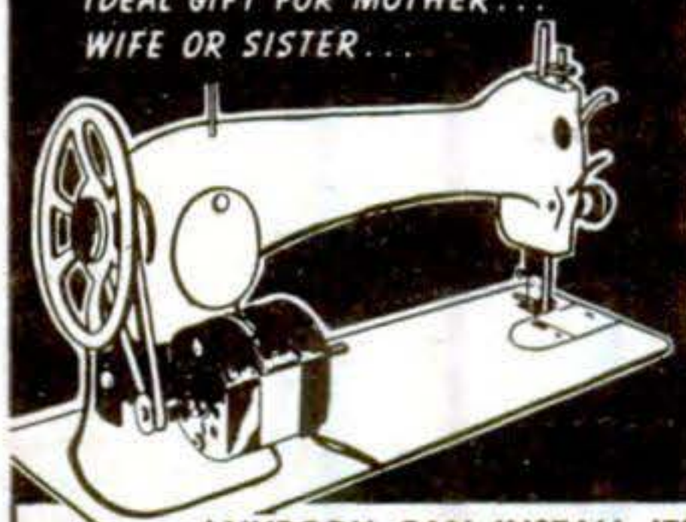
AIRBORNE SALES CO., INC. DEPT PSM 5-8 CULVER CITY, CALIF.

Say You Saw It In Popular Science

Copyrighted material

ELECTRIFY YOUR SEWING MACHINE

IDEAL GIFT FOR MOTHER... WIFE OR SISTER...

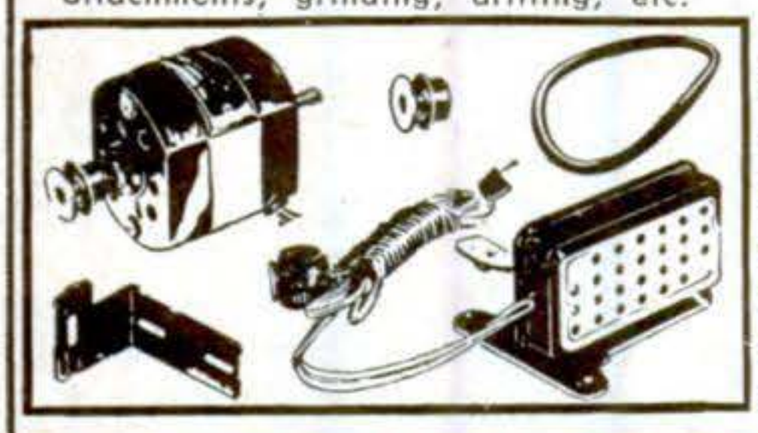


SEWING MACHINE MOTOR KIT...

NEW LOW PRICE $16.75 COMPLETE

ANYBODY CAN INSTALL IT!

SPECIAL NOTE: This 1/20 H.P. motor with rheostat can be used in all hobby workshops for flexible shaft attachments, grinding, drilling, etc.



COMPLETE SET CONSISTS OF:

- MOTOR — Universal AC or DC, 60 cycle, 115 volts.
- BELT—Long wearing rubber belt.
- PULLEY—Single grooved steel hubbed pulley.
- BRACKET—New and improved.
- FOOT CONTROL—7 step rheostat.
- CORD SET—Extension cord with plug, and socket.
- Installation Instruction Sheet.

MAIL THIS COUPON

DEPT. PS-5 **BROWNELL DISTRIBUTORS, INC.**
308 CANAL STREET, NEW YORK 13, N.Y.

Please rush.....motor kits at $16.75 ea. (postage prepaid) in:
☐ money order or ☐ check
☐ send C.O.D. and I'll pay postman $16.75 plus C.O.D. fees.

NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....

A PROFITABLE BUSINESS OF YOUR OWN?

OF COURSE! HERE'S HOW ➤

THE *Scimitar* SELF-POWERED LAWN MOWER IS THE ANSWER!

The American Way is the only way! Here is a product that will establish a future for you in a business *all your own.* The ownership of a Scimitar will make you financially independent. Own the *best* self-powered lawn mower on the market! It cuts within ½" of trees and buildings, under hedges and shrubs. Adjustable cutting heights from ½" to 3", but will cut heavy growth with ease. Trouble free, rapid performance and a *money-maker.* Remember, *it will cut one acre per hour.*

WRITE NOW! WE WILL SEND FULL PARTICULARS

POWER DEVELOPMENT CORP.
6719 DENISON AVENUE • CLEVELAND 2, OHIO

Every Driver Needs...

Pat. Pend.

only $4.95 postpaid complete

HANDE-FEED Finger-Tip Gas Control

DRIVE RELAXED! . . . install HANDE-FEED on your car and MINIMIZE DRIVING FATIGUE! Installed in about 15 minutes on most cars. Connects directly to carburetor. RELIEVES AND RELAXES THE FOOT. Minimizes back-roll on up-hill starts. Simply lift lever to increase engine speed, when released engine idles. Pivots for use with right or left hand. Does not interfere with gear shift or steering. Chrome finish. Complete instructions with every unit. $4.95 postpaid. Send check or money order, or sent C.O.D. plus postage. Dealer inquiries invited.

TRANS-CONTINENTAL IND., Dept. PS-3, 818 Olive, St. Louis 1, Mo.

Get This New TEMPLATE CATALOG *Free!*

Rapidesign Time-Saver Templates for engineers, draftsmen, architects, designers, office, store and factory layout.

Write for FREE catalog No. 48 to

RAPIDESIGN, INC.
Dept. PSM 58 Box 592, Glendale, Calif.

NEW 1948 Plastics Supplies Catalog

Just off press. Full details on Plexiglas, Lucite, rods, sheets, tubes. Acetates, cements, dyes, buffs, molding sets, tools, carving kits, accessories. Everything in plastics. Gives prices, sizes, colors, etc. Price 10c, stamps or coin, with ad for catalog.

PLASTICS MFG. & SUPPLY CORP.
Dept. S-5 4707 Euclid Ave. Cleveland 3, Ohio

Treasure and Mineral LOCATORS

Low priced, unsurpassed in efficiency, lightweight models. Miniature batteries and tubes. Credit plan available. Free literature. Dept. 558.

FISHER RESEARCH LABORATORY Inc.,
Palo Alto, Calif.

Say You Saw It In Popular Science

Get Ready for Big Opportunities!
Engineer Dobe

I Will Train You at Home Until You Get a GOOD PAY JOB in DRAFTING

TOOLS AND EQUIPMENT SENT WHEN YOU START

Get a better job with more pay and pleasant working conditions. Get into Drafting—where all products start. I will train you at home—give you experience—on the same kind of jobs you will do with the best paying firms. I furnish instruments and all equipment when you start. Write today for vital facts and FREE book. Give age.

ENGINEER DOBE • Div. 25, Libertyville, Ill.

EYE GLASSES BY MAIL

INCLUDED: Eye Glass Case, Wiper, Eye Glass Cleaner with each order! **30-DAY TRIAL OFFER. NEWEST STYLES. POSITIVE MONEY-BACK GUARANTEE.** Write today for **FREE** Catalog, Low Prices, Scientific Sight Test Chart!

Broken Lenses Replaced — 48-Hr. Service.

LEE EYE GLASSES CO., Dept. Q-7
4148 Easton • St. Louis 13, Mo.

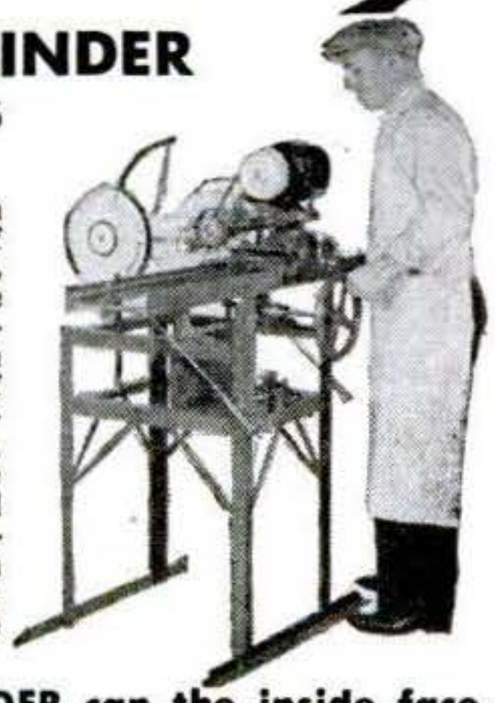
LOW AS $1.95 AND UP

SEND NO MONEY

Copyrighted material

EARN BIG MONEY
AND BE YOUR OWN BOSS
Sharpening Lawn Mowers

THE UNIVERSAL GRINDER
PUTS YOU INTO BUSINESS WITH SMALL INVESTMENT



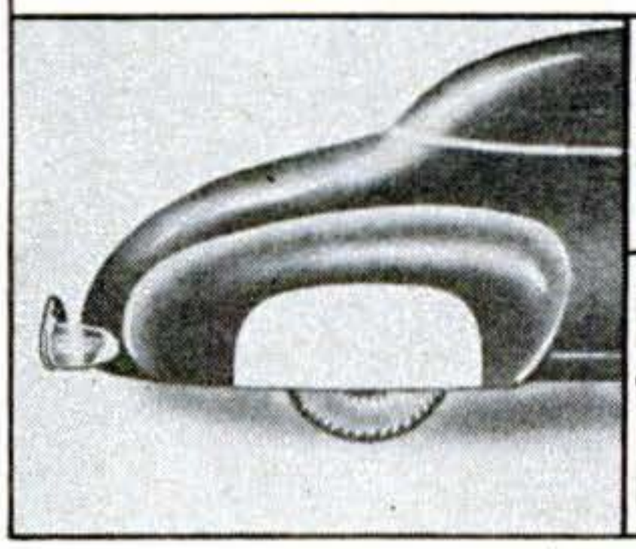
Earn as much as $400.00 a month in your basement or garage. Mr. Felber of Ind., writes, "MY UNIVERSAL GRINDER is faster and more accurate than any other grinder. Its efficiency enabled me to sharpen 450 mowers in 4½ months. More than paid for itself the first month. Every customer satisfied." Mr. Hardy of Mississippi writes, "Received my Universal Grinder the first part of May and by August 18 had sharpened over 1000 mowers." Mr. Bacon of California writes, "The lawn mower business, with my Universal Grinder, has been a gold mine these last two years."

Only on the UNIVERSAL GRINDER can the inside face, the edge of the stationary blade, and the reel blades, be ground to proper clearance *ALL IN ONE SET-UP* WITHOUT REMOVING ANY BLADE FROM THE MOWER

Free Folder

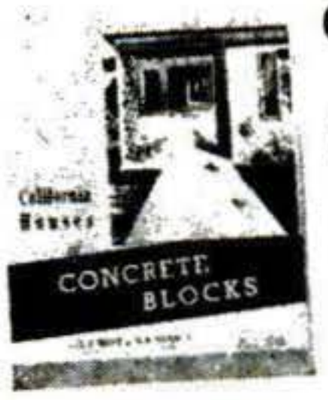
Rogers Mfg. Co., Dept. P-58, Lindsey, Ohio

FENDER SKIRTS . . . . . $17.20 PER PAIR



For Ford, Chev., Merc. Plym DeSoto, Chrv. Dodge Kaiser-Frazer and Buick. Beautify your car bring out the flowing lines inherently designed there. Sparkling beauty you'll like. Constructed of heavy gauge body steel finished in prime, perfect fit.

SANDEF MUFFLER CO.
Box 296 La Tijera Sta.,
Los Angeles 43 Calif.
Gentlemen: Please send me one set of Sander Fender Skirts as per my.....
..... (year and make of car)
☐ Check for $17.20 enclosed
☐ Ship C.O.D.



Get this book of California Homes of CONCRETE BLOCK only 50c

Planning a home? Here's a book you need. Wide variety of architect-designed house plans for 1-2-3 bedroom residences in illustrated brochure. All styles of architecture. Many exteriors and floor plans to choose from. (Complete plans & specifications, fully engineered, are available.)

Concrete block homes are easy to build; cheaper, fireproof, termiteproof, earthquakeproof. Give better insulation against sound, heat or cold. Send **50c** cash, check, etc. for plan book. We pay postage.

BROWN & TREADWAY
2412 West 7th St. Los Angeles 5, Calif.

Hollywood WOLF WHISTLE

GIVE THE *WOLF CALL* CAR HORN

—imitate BARKING DOGS and make other weird noises. You, too, can become a Hollywood Wolf. Have lots of harmless fun. Install a Hollywood Wolf Whistle on your car. Beautiful Hammertone finish. Self lubricating bearings. Works off of the intake manifold. Simple to install in 15 minutes. Full instructions with every box. For cars, trucks, motorcycles, motor boats, outboard motors. Money back guarantee. If your dealer can't supply you, order today. Be the first to have this attention-getting horn. ONLY $4.00 postpaid — Cash, Check, or Money Order. QUITE A DEAL. "Sorry, no individual orders outside U.S.A."

DESCRIPTIVE LITERATURE ON REQUEST

YODER MFG. COMPANY
2403-B East 103rd Street Los Angeles 2, California

Now Any AUTO REPAIR JOB
CAN BE "Just Your Dish!"

This Manual Shows You How To Repair ANY Part of ANY Car!

WE defy any job to throw you when you've got MoToR's *New* AUTO REPAIR MANUAL! You can repair anything from carburetor to rear end—quickly, easily, RIGHT. Look up make, model, job—and go to it! Clear, illustrated guide leads you easy—step-by-step.

Compiled from 150 Official Factory Shop Manuals!

This great book—700 big 8½" x 11" pages—brings you over 200,000 service, repair, adjustment, replacement, tune-up facts covering every make and model car built from 1935 to '48. Over 1700 cutaway pictures, diagrams show exactly WHAT to do, HOW to do it. Used by U. S. Army and Navy. New 1948 Edition.

FREE 7-Day Offer

Just mail coupon! If not completely convinced that book is greatest time and money-saver you've ever seen, return it in 7 days; pay nothing. **MoToR Book Dept., Desk 2E, 572 Madison Ave., New York 22, N. Y.**

FREE 7-DAY TRIAL

MoToR Book Dept., Desk 2E,
572 Madison Ave., New York 22, N. Y.

Rush to me at once **MoToR's AUTO REPAIR MANUAL.** If O.K. I will remit $1 in 7 days, (plus 35c delivery charge), then $2 monthly for 2 months, with a final payment of 95c one month later. Otherwise I will return book postpaid in 7 days. **(Foreign price, remit $8 cash with order).**

Print Name _____ Age _____

Print Address _____

City _____ Zone No. (if any) _____

State _____ Occupation _____

☐ **Check box and SAVE 35c delivery charge** by enclosing WITH COUPON entire payment of $5.95. Same 7-day return-refund privilege applies.

Copyrighted material

Speed Thrills! **MINIATURE RACING** with ***JET POWER*** and ***ENGINES***

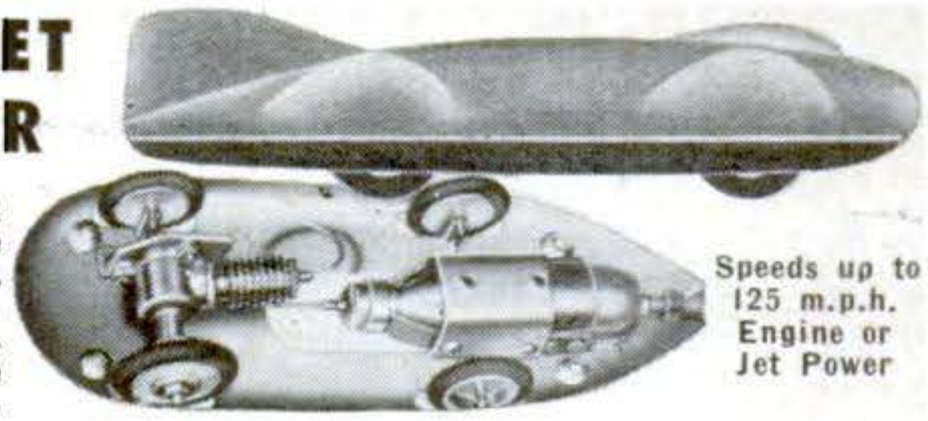
THIMBLE DROME RACER

Power with Gas or Jet Engine. Free Instructions with Each Car

New scale model of midget racer, the classiest thing you ever laid eyes on. Die Cast aluminum body, turned aluminum, rubber-tired wheels with treads. Chrome exhaust stacks. Wobble pump. Simulated leather seat and back. Instrument panel and numbers. Equipped with bridle lugs for cable track racing. Car is 9⅜" long, 4" high, weighs 18 oz. Can be powered with CO_2 engine or most gas engines. Instructions accompany each car. Only $3.95. Postage 30c additional.

$4.25 Postpaid

GAD-JET RACER



Speeds up to 125 m.p.h. Engine or Jet Power

All metal miniature racer, ultra streamline design. Aluminum, die cast, two-part body, aluminum wheels, rubber tires. Completely finished, ready to go, with clip for jet cartridge racing, only $1.50. Same, with OK CO_2 engine and conversion kit for installing engine at home, $6.95. Add 20c for postpaid delivery either model.

Rush Order to Address Below. If you prefer C.O.D. Delivery send $1.00 deposit with order.

HOME SHOP PRODUCTS COMPANY, Dept. 25, 4821 Sheridan Road, Chicago

---

LIGHT FIXTURE

Army Surplus

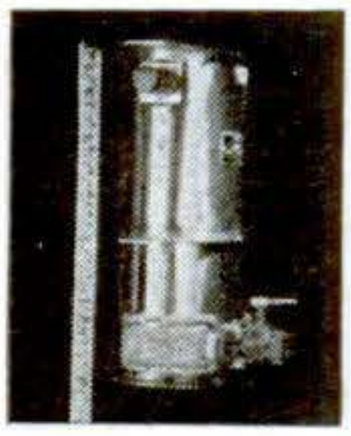
Complete with bulb. 110 Volt. No C.O.D.s. Shipped Parcel Post or Express. F.O.B. Detroit.

2 FOR $1.95

RADIO CENTER

2530 E. Davison • Detroit 12, Mich.

HEATERS



Gasoline, burning 40,000 B.T.U. built by Stewart Warner for USAAF as cabin and engine heaters. Brand new and in original cases. Ideal for installation in trucks, buses, trailers, small buildings, etc. No exposed flame. Approx. shipping wt. 40 pounds. A bargain at..... **$28.50 each**

Send check or money order to: **while they last**

MICHEHL INDUSTRIES ATLANTIC BLDG. WASHINGTON, D. C.

REFRIGERATION

AIR CONDITIONING—Trained men paid well to service, install, maintain, repair, rebuild household and commercial refrigerators. Opportunity for full time, spare time earnings. Train at home or in our big shops. Approved for Veterans. (Non-Veterans inquire about our Low Payment Plan and Pay After Graduation Plan.) Send for FREE BOOKLET and FULL information. No obligation.

COMMERCIAL TRADES INSTITUTE, Dept. A1-5
1400 W. Greenleaf Chicago 26, Illinois

NEVER TOLD BEFORE

"JOLTING" JOE DiMAGGIO'S OWN STORY!

The most exciting moments of the past ten years of baseball, told in THE YANKEE CLIPPERS own words—Stories about 150 other stars—Famous throws, hits, tight spots, and anecdotes about baseball's greats.

LUCKY TO BE A YANKEE

Smash-Hit Baseball Story of the Year

An action packed, intimate story of Joe DiMaggio. **244 PAGES** including **34 FULL PAGE PHOTOS OF TED WILLIAMS, GREENBERG, OTT, FELLER, DICKEY,** etc. **AUTOGRAPH** pages in back of book—also a specially written chapter on **HOW TO HIT AND FIELD.**

The Best Baseball Book Ever Written

Paper edition $1 postpaid. DeLuxe cloth ed. $2 postpaid

RUSH YOUR ORDER
Send Check, Cash or Money Order Today!! To

A. F. TUBRIDY

Dept. PS 365 E. 201 N. Y. 58, N. Y.

U. S. GOVERNMENT SURPLUS

ALL WEATHER HAMMOCKS

BRAND NEW

Cost Govt. $30.00.

$5.95

Parcel Post & Handling add 40c

Weatherproof Roof, Mosquito Netting with Zipper, Waterproof, Mildewproof. Made of combination Synthetic Rubber-treated Poplin Duck Material, double reinforced bottom. FOLDS COMPACTLY.

I. GOLDBERG & CO., 429 Market St., Phila. 6, Pa.

SEND FOR NEW FREE CATALOG P.S.

MORE POWER FROM YOUR ENGINE

WITH PERFECT TIMING

Keep the timing of your car, motorcycle, outboard or boat engine, tractor or any gasoline engine "right on the nose" with this amazing new TIMERLIGHT. Easy to use. Attach one clip to engine block, the other to spark plug wire. Flash shows timing. A must for motorists, boat owners, farmers, mechanics. Nothing else like it. Send for yours NOW. Money back guarantee.

DEALERS: Good territory open. Write for details.

CONNIE BERT CO., 8115 Clinton Road, Cleveland 9, Ohio

PARCEL POST PAID Only $1.49

BAR BELLS

Buy Direct From Factory
Save 20% to 30%
Write for Free Booklet and Price List

$8.95 up

INDEPENDENT IRON WORKS
2440 EAST 23RD STREET, DEPT. C
LOS ANGELES, CALIFORNIA

Ball-Bearing *SPEED WHEELS*

Dealers and Manufacturers inquiries invited

Juvenile wheels, solid tire—No Bearings

7" wheels	60c
6" wheels	50c
4" wheels	30c

Semi-pneumatic tired wheels

12 x 1.75"	$3.25
10 x 1.75"	$2.75
10 x 1.25"	$2.00
8 x 2"	$2.00

Industrial wheels for heavy loads
Semi-Pneumatic

400 x 8, 2 ply tire and tube	$12.50
10 x 2.75" Hollow Core	$6.75
10 x 2.75" Single Tube	$7.25
12 x 3.00 wheel bolted hub	$9.75
8 x 2.50"	$4.90
6 x 2" spot welded	$2.80
6 x 2" lug base @	$3.30

Free blueprints with all wheel orders.
Send check with order. Shipments f.o.b. Akron.

JIM BROWN TOY COMPANY

1093 Home Ave. Akron 10, Ohio

Copyrighted material

PIPE SMOKERS' DELIGHT

Enjoy the relaxing luxury of a fine pipe imported from Czechoslovakia. Both pipes are bowl capped and stems horn bit, with bruyere bowls. Stem of long pipe is made of genuine cherry with moisture trap. We also have the long pipe in metal-lined bowl at $4.25. State which you prefer.

Immediate Delivery

ORDER TODAY!

Send cash, check or money order for full amount and we prepay postage. C.O.D.'s — postage extra on C.O.D. orders.

Direct from Czechoslovakia

$3.95

$2.95

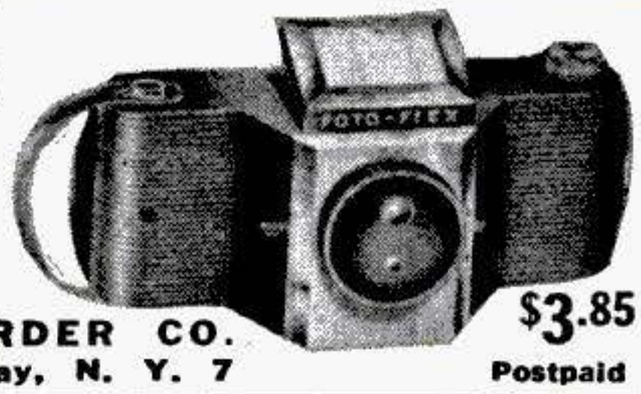
MACH CO.,
CZECHOSLOVAK IMPORTERS
2553 S. Ridgeway Ave. Dept. 066 Chicago, Ill.

FOTO-FLEX

Twin Lens Reflex Camera

- Snap to operate
- 12 exposures
- Film—25c per roll
- Beautifully moulded
- Send full amount

Money back guarantee



$3.85

DOMEX MAIL ORDER CO.
Dept. S. 170 Broadway, N. Y. 7 **Postpaid**

ASSEMBLE THIS BEAUTIFUL COLONIAL POST LAMP

- These new kits bring the popular colonial lamp within reach of all craftsmen. Complete instructions furnished, all parts correctly sized and formed. 16" high, 10" square, 3" post diam. These rugged lamps make ideal gifts.

Kit No. 1. You solder frame. **$7.95** each
Kit No. 2. Frame ready-welded, you complete job with screwdriver. . . . **$9.95** each
Complete Lamp as shown, finished in dull black, ready to install, less bulb. . . **$14.95**
We pay postage, money-back guarantee. Send check or money order, or ask for **free literature.**

LORENZEN INDUSTRIES, Dept. PS-5, Niles, Mich.

Say You Saw It In Popular Science

Learn How to HYPNOTIZE!

***Develop your personal* POWER!**
NOW . . . revealed for you . . . are the secrets of **practical hypnotism** . . . that strange, compelling force by which an expert operator can bring others under his power. He can **sway** people at will—issue commands and be obeyed—virtually cast a **spell** over his subjects. This sensational knowledge may make YOU a more dominant, masterful personality.

Illustrated* SELF-INSTRUCTION COURSE *in Useful Hypnotism
Amazing lessons in simple, easy-to-understand language. How to select a subject—how to hypnotize by telephone—**how to make money** from hypnotism—mental telepathy—stage hypnotism—self-hypnosis—how to use **modern** hypnotism to conquer inferiority complex, timidity, etc. Clear helpful pictures show operating positions, movements. **Startling low price.** Satisfaction guaranteed or money back.

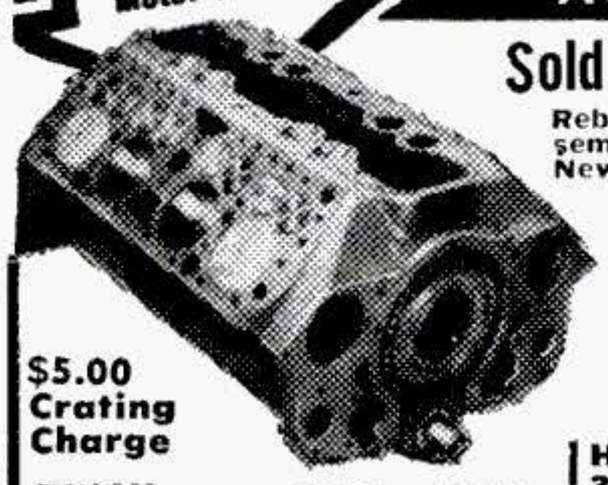
COMPLETE ONLY $1.95

SEND NO MONEY! Simply pay postman $1.95 plus C.O.D. postage—or send $1.95 and we pay postage; same money-back guarantee. Order "Hypnotism Course" today! Nelson-Hall Co., 1139 S. Wabash Ave., Dept. 2E01, Chicago 5, Ill.

Carries the Same 90 DAY GUARANTEE As a New Motor Assy.

Our Finest Precision REBUILT

MOTOR BLOCK ASSEMBLIES



Sold Outright or Exchange

Rebuilt by skilled mechanics. Assembly has Rebored Block with New Pistons, Pins, Rings, Reground Crankshaft, and all New Bearings. Guaranteed 90 Days.

Allowance on Old Motor
We ship at outright price. Send your motor prepaid, must be suitable for rebuilding. Send in notarized bill of sale showing title number if any. We refund difference when we receive your motor.

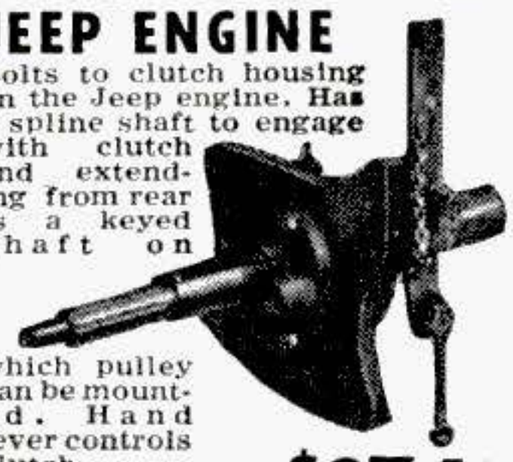
$5.00 Crating Charge

BUICK	Outrt.	Exch.
34-47 8cyl.	$199.00	$160.00
CHEVROLET	**Outrt.**	**Exch.**
29-47 6 cyl.	117.50	87.50
CHRYSLER	**Outrt.**	**Exch.**
35-47 8 cyl.	199.00	160.00
DODGE—3¼" bore	**Outrt.**	**Exch.**
33-47 6 cyl.	144.00	109.00
FORD	**Outrt.**	**Exch.**
28-31 4 cyl.	119.00	87.00
32-34 V8 . .	139.00	99.00
35-47 V8 . .	149.00	99.00

HUD.-TERRA.	Outrt.	Exch.
35-47 6cyl.	$175.00	$135.00
MERCURY	**Outrt.**	**Exch.**
39-47 V8 . .	149.00	99.00
OLDSMOBILE	**Outrt.**	**Exch.**
37-47 6 cyl.	175.00	135.00
35-47 8 cyl.	199.00	160.00
PLYMOUTH	**Outrt.**	**Exch.**
33-47 6 cyl.	139.00	109.00
PONTIAC	**Outrt.**	**Exch.**
37-47 6 cyl.	175.00	135.00
35-47 8 cyl.	199.00	160.00
STUDEBAKER	**Outrt.**	**Exch.**
35-47 6 cyl.	175.00	135.00
35-47 8 cyl.	199.00	160.00

We Can Supply REBUILT ENGINES, TRANSMISSIONS, REAR ENDS, etc., for Cars and Trucks. Also JEEP ENGINES. Write for Prices!

POWER TAKE-OFF for JEEP ENGINE

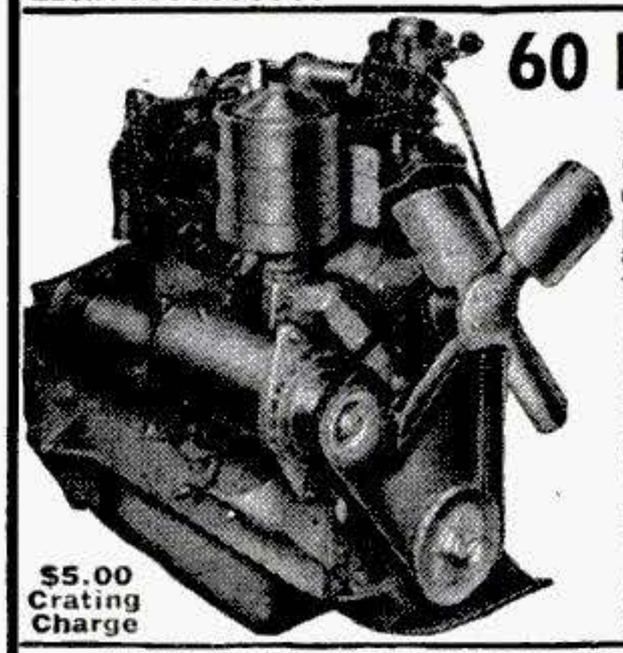


Bolts to clutch housing on the Jeep engine. Has a spline shaft to engage with clutch and extending from rear is a keyed shaft on which pulley can be mounted. Hand lever controls clutch.
SF4N-23J—Each **$37.50**

NEW 5 Gal. CANS

FOR GAS, OIL OR WATER
Vented for Safety.
Self-locking Safety Cap
Extra Heavy Construction
Will Float When Full
Size of can, 18" high, 6¼" thick, 13" wide.
SA35U-60—
Lots of 5, ea. 1.15
Lots of 50, ea. 1.05
Lots of 100, Each 98c

60 HP. JEEP Engines



Reconditioned, Tested and Guaranteed in perfect running order and ready to run. Every part is checked to be perfect and carries a 90 Day Guarantee same as a new engine.

COMPLETE with . . . Generator, Starter, Distributor, Coil, Fan and Fan Belt, Water Pump, Fuel Pump, Intake and Exhaust Manifolds, Carburetor, Oil Filter, Spark Plugs, Flywheel, Clutch and Pressure Plate, and Wiring.

$5.00 Crating Charge

Outright, SG58R-003, Each **$198.50**

SEND 25% CASH WITH ORDER, BALANCE C.O.D.

J.C. WHITNEY & Co.

1919 Archer Ave. Chicago 16, Ill.

MARK GOLF BALLS . . . EASILY

"Ballmark" stamps your name into golf balls. Avoid mix-ups. Lost balls returned to you. Nationally famous, durable, colorful plastic with metal type. NEW DE LUXE KIT, *includes extra bottle of ink. An unusual gift,* complete with any name. Order today from us or your dealer **2.50**

HOLIDAY PRODUCTS CO., DAYTON 1, OHIO

Learn A Trade NOW!
PRACTICAL SHOP TRAINING!

In Our Chicago Shops

TRADES THAT PAY

LEARN BY DOING

- Auto Mechanics
- Machinist
- Diesel Engines
- Welding, Gas & Arc
- Refrigeration
- Piano Tuning

Above approved for G.I.'s & Civilians

- Body & Fender Repair

ESTABLISHED 1902

VISITORS WELCOME

—CALL IN PERSON OR MAIL THIS AD TO—

GREER SHOP TRAINING

(Dept. PS-358) 460 South State St., Chicago 5, Ill.

Please send without obligation free information regarding trade checked above. (Specify whether you are a Veteran ☐ or Civilian ☐)

Name.....Age.....

Address.....

City.....State.....

Earn BIG PAY Now!

thousands of ambitious men helped

• BIG SHOP TRAINING •

FREE EMPLOYMENT SERVICE

Learn These Trades in the Big Allied Shops

Choose one of these **6** LEADING TRADES

- Machinist Trade
- Tool & Die Making
- Tool & Die Machine Designing
- Mechanical Drafting
- Tool Engineering
- Industrial Product Illustration

Largest School of its Kind in the World

FREE! BIG METAL TRADES ILLUSTRATED BOOK

APPROVED FOR VETERANS

WRITE TODAY: A 1c Postcard will do.

ALLIED SCHOOL OF MECHANICAL TRADES

1338-1340-1342 So. Michigan Ave. Est. 1928

445 Allied Bldg. CHICAGO 5, ILL.

NYLON FISHING LINE $1.98

Approximately 1500 Feet

2 ply (25 pound test)—rubberized—water proof—long life. Send cash, check or money order. We prepay postage. **ALLENDER & CO., Dept. 989, 2346 So. Dearborn St., Chicago 16, Ill.**

ACCURATE TARGET SHOOTING

Indoor or Out

AT LOWEST COST

Boone AIR TARGET PISTOL **$3.95**

including 150 standard BBs. **Postpaid**

9¾ in. long. Solid aluminum grip and body; rustless steel barrel. Postpaid if prepaid, or send $1. with $2.95 plus postage COD.

PRECISION SPORTS PRODUCTS, Parma 11, Mich.

AT LAST! An Amazing New

ADDING MACHINE

Everyone Can Afford!

Professional Appearance • Figure-Magnifying Plastic Lens • Figure Clearing Lever

Lowest Price Ever Asked for a REAL ADDING MACHINE

This substantial, professional-looking GUARANTEED machine gives you lifelong, accurate figuring service at an amazingly low price! Pays for itself in errors avoided and time saved. The new "Precise" adds, subtracts, multiplies—with easy stylus operation. ***No paper tape to bother with.*** Totals come up on the Polystyrene magnifier instantly, automatically, accurately! Counts up to 99,999.99. Professionally built with internal construction of steel, bronze and brass throughout; Zamac cast metal case, in handsome, two-tone baked spray lacquer finish; number plate is solid bronze, with etched red and black figures for easy visibility. 7" x 5" x 4¾". With complete instructions. Portable, fool-proof, rugged. A real adding machine at a fraction of the usual cost! **It's an Ideal Gift Item!**

NOT A POCKET TOY OR GADGET

A *Real* BUSINESS-LIKE ADDING MACHINE

Easy to Use
Guaranteed
Accurate

ONLY **$19.95** COMPLETE (Postpaid on paid orders)

FREE TRIAL!

10 DAY TRIAL. Full Money-Back Guarantee! YOU RISK NOTHING. Use the "Precise" Adding Machine for 10 days. If you're not completely satisfied, return it for full refund. Every machine is covered by a full year's guarantee for materials and workmanship; free repair during guarantee period. Order today—we'll ship C. O. D., or postpaid on paid orders.

TAM PRODUCTS, Dept. S-58
3814 Wrightwood Ave., Chicago 47, Ill.

☐ Ship me one "Precise" Adding Machine
☐ $19.95 enclosed. ☐ Ship C. O. D.

Name.....

Address.....

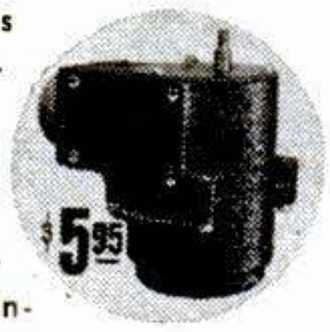
City.....Zone.....State.....

ORDER TODAY!

ADDS! SUBTRACTS! MULTIPLIES!

For Everyone:
Homes
Stores
Offices
Factories
Teachers
Students

ROTATOR MOTOR FOR BEAM ANTENNA



110V. AC operated. Requires only 12 MFD or larger condenser Reversible. Appr. ¾ RPM, hi-torque. No free swing. Easy to mount. Ideal for ham, television use. With simple instructions. Surplus—New boxes. $5.95 postpaid in cont. U.S.A.

ALVARADIO, DEPT. P-1, 903 S. Alvarado, Los Angeles 6, Calif.

CARBURETOR TOO RICH

MAKES MOTORIST TOO POOR

Car owners who are wasting money and not getting proper gas mileage due to over-rich mixtures will be pleased to learn how to save gasoline by VACU-MATING over-rich mixtures. VACU-MATIC fits all cars, trucks and tractors. It is *automatic* and operates on the supercharge principle. Easily installed in a few minutes.

SALESMEN WANTED! Big Profits! Send name, address on penny postcard for *free particulars* and how to get yours for introducing.

VACU-MATIC CO., 7617-1330 W. State St., WAUWATOSA, WIS.

ELECTRIC SHEAR SHARPENER

OVER 35,000 SOLD—IT MUST BE GOOD!

Genuine Carborundum wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door. complete with electrical goods catalogue.

Motor driven **$9.75** complete with vise

WILLIAM MARVY COMPANY, Dept. 7
479 St. Peter Street St. Paul 2, Minn.

Copyrighted material

WAR Surplus

AND OTHER Startling BARGAINS!

BRAND NEW Khaki SUN TAN SHIRTS & PANTS

BRAND NEW! Pants made of 8 oz. and shirts of 6 oz. mercerized khaki suntan twill materials. Well tailored. Add 8c per garment postage.

SHIRTS 14 to 17 2.99 PANTS 29 to 42 3.79

SEND FOR FREE

SENSATIONAL VALUE!

Aviators' Style SUN GLASSES 2.88

Precision made. 24 K GOLD PLATED METAL FRAME. 4 base curve. Opthalmic ground. Pearl sweatband. SHUTS OUT 96% OF THE ULTRA VIOLET RAY We sold thousands at $6.00. Add 12c postage and handling.

50 FT. HANK NYLON PARACHUTE CORD

59¢

New. 3/16 inch diameter. Ideal for clothes lines and venetian blind and drapery cords. 550 lbs. tensile strength. Add 3c postage.

NAVY STYLE T-SHIRTS

Brand new. Sizes, small, medium and large. White only. Fine long staple combed cotton yarn. Add 3c per garment postage.

69¢

Greatest Watch Value in U.S.A! 17-JEWEL Military Style

Think of it! Here is a genuine 17-jewel wrist watch with a GUARANTEED SWISS MOVEMENT. WATER & DUST REPELLANT, SHOCKPROOF, ANTI-MAGNETIC, RADIUM DIAL and SWEEP SECOND HAND. Set in a genuine stainless steel case with a fine leather strap. Save at least $15.00. If you don't think this the greatest value in the U.S., return it for refund.

19.95 PLUS 10% FED. TAX

U.S. NAVY WORK JACKETS

U. S. Navy Regulation
First Quality
Brand New
Full Cut Sizes

1.69

Made of 8 oz. green herringbone twill. Tailored to Navy specifications. Ideal utility and work jackets. Add 10c per garment postage.

WAR Surplus CIRCULAR

OVER 150 OUTSTANDING WAR SURPLUS BARGAINS ---also many other special offers.

Surplus NAVY UNLINED FIELD JACKETS

BRAND NEW. Made of fine quality water-repellant poplin material. Unlined, full zipper front, 2 slash pockets. WORTH TWICE OUR PRICE. Add 10c postage.

3.99

Surplus DUST MASKS

33¢

Brand new. For paint or insect spraying. For millers and farmers. Perfect dust protection. Add 5c postage.

O.D. wool serge SHIRTS-PANTS

Used but in excellent condition, perfect. They have been designated for RE-ISSUE BY THE GOV'T. Pure wool serge. Less than the price of the cheapest overall. Add 8c per garment for postage.

SHIRTS 13 to 15 2.69 PANTS 27 to 33 2.79

MAIL ORDERS

Please send remittance with order. Include postage. Order will be sent C.O.D. plus C.O.D. fee. Satisfaction or your money back.

Send today

SIOUX FALLS SURPLUS STORE SIOUX FALLS, S.D.

Say You Saw It In Popular Science

Live in a House?

This light, strong, easily handled device—weight-tested to 500 pounds—will let you *Wash—Paint—Putty Your Windows—Hang Screens* and *Awnings—Service Combination Storm Windows without a Ladder!* Protective steel railing—wide substantial floor—rubber house protectors. Model H adjustable to all household wall thicknesses—9" to 17". $10.50 postpaid. $9.85 C.O.D. plus fee. Money back guarantee. Patents pending. A Morsafe* Product. Agents—Dealers—Territories Open. *Trademark

THEN YOU NEED A WindoStep*

FOR ALL OUTSIDE WINDOW WORK ...UPSTAIRS OR DOWN

An Ideal Gift

MORRISON CRAFTERS
703 Miami Street, Toledo 5, Ohio

NAME _____

ADDRESS _____

CITY _____ STATE _____

C.O.D. ☐ PREPAID ☐

PS-5 SEND CIRCULAR ☐

Copyrighted material

★ WRIST WATCH
★ STOP WATCH
★ TELEMETER
★ TACHOMETER

Phenomenal Value!

17 JEWEL • 2 PUSH BUTTON

CHRONOGRAPH

ONLY **$29.75** PLUS 10% TAX

INCABLOC SHOCK RESISTANT FEATURE
• Sweep Second Hand • Radium Dial • Anti-Magnetic • Unbreakable Crystal. (formerly $71.50)

IDEAL FOR
• Physicians • Engineers
• Radio Men • Sportsmen
• Photographers • Aviators

OUR GUARANTEE
MONEY BACK IN 10 DAYS
If not satisfied for any reason

ADLEW JEWELERS
117 W. 42nd St., N. Y. C. 18
Mail Orders Promptly Filled • Shipped C. O. D. or send check or money order.
Address mail-orders to: ADLEW JEWELERS (Dept. PS-5), 152 West 42nd St., N.Y.C. 18.

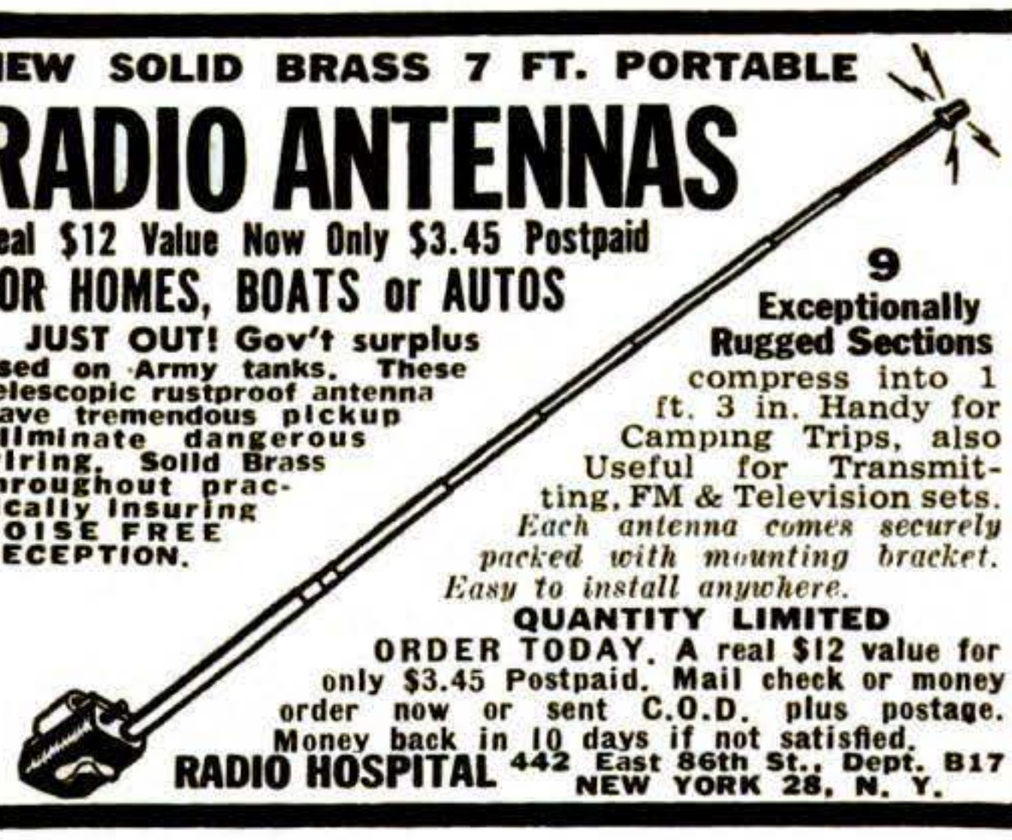
Also available in 18-k Gold Case. $64.50 (plus 10% tax), formerly $125.

NEW SOLID BRASS 7 FT. PORTABLE

RADIO ANTENNAS

Real $12 Value Now Only $3.45 Postpaid

FOR HOMES, BOATS or AUTOS



JUST OUT! Gov't surplus used on Army tanks. These telescopic rustproof antenna have tremendous pickup eliminate dangerous wiring. Solid Brass throughout practically insuring NOISE FREE RECEPTION.

9 Exceptionally Rugged Sections compress into 1 ft. 3 in. Handy for Camping Trips, also Useful for Transmitting, FM & Television sets. *Each antenna comes securely packed with mounting bracket. Easy to install anywhere.*

QUANTITY LIMITED

ORDER TODAY. A real $12 value for only $3.45 Postpaid. Mail check or money order now or sent C.O.D. plus postage. Money back in 10 days if not satisfied.

RADIO HOSPITAL 442 East 86th St., Dept. B17 NEW YORK 28, N. Y.

RESORT OPERATION AND MANAGEMENT

Your Front Opportunity is today's growing demand for more Outdoor Life and Recreation. Ride this opportunity by establishing your own Resort. Book "tells how" based on years of experience. Covers many problems, management, operation, planning, etc. One hundred pages, $2.00 copy postpaid.

WOODBECK PUBLISHING Co.
WINCHESTER BLDG. GRAND RAPIDS, MICH.

Outstanding SURPLUS

VALUES

SUN GLASSES

Army and Navy approved. Low-res Naturalite. Eliminates 96% of the Ultra-violet and Infra Red Rays, Frames are 1-10, 12 K., G.F., genuine leather lined case. Pearl paddle temples, sweat bar and pads. Wonderful value..... **$3.98**

HUNTING KNIVES

Brand new. 6" blade, dull finish, hard leather handle. (11" overall). Genuine sole leather sheathes. For Camper, Fisherman, Hunter, etc. Only..... **$1.95**

Add 10% for handling and shipping.

NATIONAL SURPLUS SALES CO.
1810 Charlotte — Kansas City, Mo.

GARDEN TRACTORS

$146.50 F.O.B. RAVENNA

Latest Model C SPEEDEX

1½ Horsepower with cultivator, 500-12 pneumatic tires, powered with Briggs and Stratton engine, and many other features. Deliveries being made now. Prices slightly higher West of the Rockies.

P-248-33

WRITE FOR FREE BOOKLET

POND GARDEN TRACTOR
BOX 216 — RAVENNA, OHIO
5821 First Ave., South — Seattle, Wash.

DEEP TONE

Dual Mufflers

for Ford, Mercury

Scientifically designed straight-thru muffler reduces back pressure. Greater power, speed, and economy. NEW brilliant Deep Tone makes your car standout. Heavy blowout-proof construction. Rugged steel tube throughout (No aluminum).

Simplified Installation. No cutting, no holes to drill. Rubber mounted clamps eliminate usual rattle. Complete with all necessary fittings, etc. Order direct and save. State year and model. Sent C.O.D from Los Angeles. Price $20.

"Deep Tone" single muffler for Chevrolet, Ford, Plymouth—$4.86.
All other makes—$5.50. Chrome tail pipes, 2½" dia. $1.75

ADVANCE MUFFLER CO.
6800 S. Vermont, Dept. PS-58, Los Angeles 44, Calif.

BUILD YOUR OWN FAST FREEZER

PLANS $1

5 sizes 8 to 40 cu.ft.

It's easy to build this household appliance with LeJay Plans. Made from new or used parts. Save up to 75%. No expert knowledge needed. Plans show 5 sizes and are easy to follow. All details clearly explained. Enjoy making one of these freezers. Mail **$1** for set of plans and catalog. **LEJAY MFG. CO., 423 LeJay Bldg., Minneapolis 8, Minnesota**

TINYMITE

MIDGET RADIO!

FITS IN YOUR HAND! ONLY ¼ LB. Beautifully molded red cabinets! **No tubes—batteries or electric "plug-ins" needed!** Has scale dial—personal phone, **new type** fixed power crystal diode. **One Year Service Guarantee.**

GUARANTEED TO WORK on local stations if used as directed. **USE MOST ANYWHERE in bed, hotels, offices, farms, homes, etc.**

SEND ONLY $1.00 (bill, money order, check) and pay postman $2.99 plus C.O.D. fees on arrival or send **only** $3.99 for postpaid delivery!

Complete—Ready to play—Excellent gifts for boys and girls. ORDER YOUR TINYMITE RADIO TODAY **AT THIS BARGAIN PRICE!** (Foreign $5.00 U. S. cash.)

PAKETTE RADIO COMPANY, INC. Dept. TPS-5 KEARNEY, NEBRASKA

Copyrighted material

PRINT YOUR OWN POST CARDS

COMPLETE OUTFIT *only* **$7.50**

Amazing results in sales, inquiries and contacts . . . saves time and money . . . very easy to use GEM STENCIL DUPLICATOR is ideal for *Advertising, Announcements, Notices, Labels, Forms, Price Lists*—hundreds of uses for every type of business and organization. Comes complete with all supplies, instructions and 60-page Book of Ideas.

FREE TRIAL OFFER: Try it before you buy it! Write and a GEM OUTFIT will be sent you postpaid. After 10 days, send only **$7.50** or return the GEM, no questions asked. The GEM must sell itself; you be the judge.

BOND EQUIPMENT CO. • Dept. 151
513 Olive St. • St. Louis 1, Mo.

SEND NO MONEY • FREE TRIAL OFFER

RELEASE the Full Power of YOUR MIND

Send for free booklet telling how you can achieve success and reach your personal goals. Find out how to remove frustrations and inferior feelings. Learn how to make your subconscious mind work *for*, not against, you. Write today. No obligation.

Broadwell Studio Schools, Dept. 8E **Covina, California**
Established 22 Years

BUILD HEAVY DUTY MACHINES

SAVE UP TO 90% You can build, using our practical, easy-to-read plans, all kinds of machines, for home, farm or shop—scooters, portable sawmills, metal working machines, concrete machinery of all kinds, printing equipment, woodworking machines, midget autos, dish washers, farm equipment, freezers, tractors.

FREE
CATALOG HANDBOOK
183 SETS OF PLANS
VALUABLE INFORMATION

NICHOLS EQUIPMENT COMPANY
Dept. D-1104, PURVIS, MISS.

INSTANT NICKEL

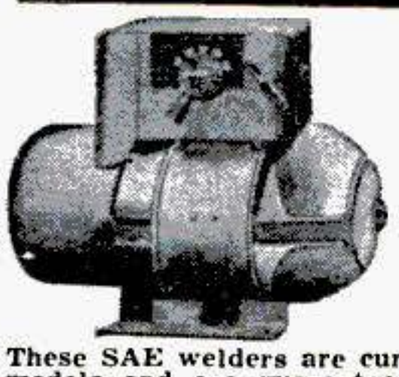
NO CURRENT OR BATTERIES USED

COMPLETE $2.50 POST PAID COVERS 10 FEET AGENTS WANTED

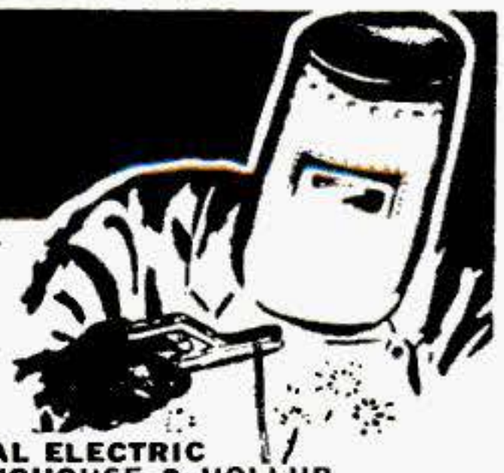
Just rub New INSTANT NICKEL on iron, steel, brass, aluminum, bronze or copper and INSTANTLY it takes on a permanent heavy plating with REAL NICKEL! Makes old, worn or shabby articles look like new. No mercury or cyanide in it. No copper plating necessary. Patented Jan. 20, 1948. Re-nickel for friends, neighbors at handsome profit. Fascinating hobby. Sensational introductory offer: Complete kit for only $2.50 postpaid. C.O.D.'s few cents extra. Money back Guarantee.

INSTANT PLATING, Dept. 2, 1216 Park Row Bldg., New York 7, N. Y.

SENSATIONALLY Low Priced ARC WELDERS!



$97.50 TO $147.50



- GENERAL ELECTRIC
- WESTINGHOUSE • HOLLUP
- LINCOLN • HOBART • WILSON

These SAE welders are current models and are guaranteed to be in good operating condition. All models available. ORDER NOW! Send for FREE PRICE LIST of models.

New Welding Cable. 2/0 Extra flexible. Built for high-speed operation. Flame and oil resistant covering. All you want at 21c ft.

220-440 volts, 3 phase, 60 cycle, AC motor. 200, 300 or 400 amps.

SEND CASH or CHECK 50% deposit on C.O.D's. Prices FOB Los Angeles.

Jackson Electrode Holder. New. Holds 1/16" to 1/4" rods. Weighs 22 oz. 300 amp. capacity. Replaceable jaws. Special $2.75.

THE B. F. M. CO. 3316 E. Olympic Blvd., Los Angeles 23, Cal.
2821 Brooklyn Ave., Los Angeles 33, Cal.

MAIL ORDER Sale — GENUINE U.S. GOVT. WAR SURPLUS

Amazing savings on quality supplies for summer camps and campers, sportsmen, farmers, householders, motorists. Order specials below. Write for bulletins on photographic or radio equipment, or write us your wants.

SLEEPING BAGS

100% Wool Army Sleeping Bags: Complete with new water repellent outside covers. Below cost of raw materials. **$3.95**

ASSAULT BOATS

5 passengers.

Sturdy ply-wood base. Canvas over rubber. Complete with top and other extras. Fun at camp and shore. **$34.50**

U. S. NAVY FISHING KITS

72 piece ass'td outfit. Hooks, sinkers, lines, etc. Cost gov't far more. **$3.45**

100% WOOL BLANKETS

Australian wool. Reconditioned like new. **$3.49**

LIFE PRESERVER BELTS 98c

Inflate automatically by compressed air capsules, or by hose. Adjustable in waist size. Airtight. Guaranteed. 2 cartridges included with each belt.

U. S. ARMY FLASHLIGHTS:

Shock-proof. 2 cell, Belt Clip. **79c**

DELTA LANTERNS $1.98

Extra bright light, with battery.

T SHIRTS: 3 for $2.00

New. White. Small, medium, large.

U. S. Navy Dungarees: $2.29

New. Perfect quality. State size.

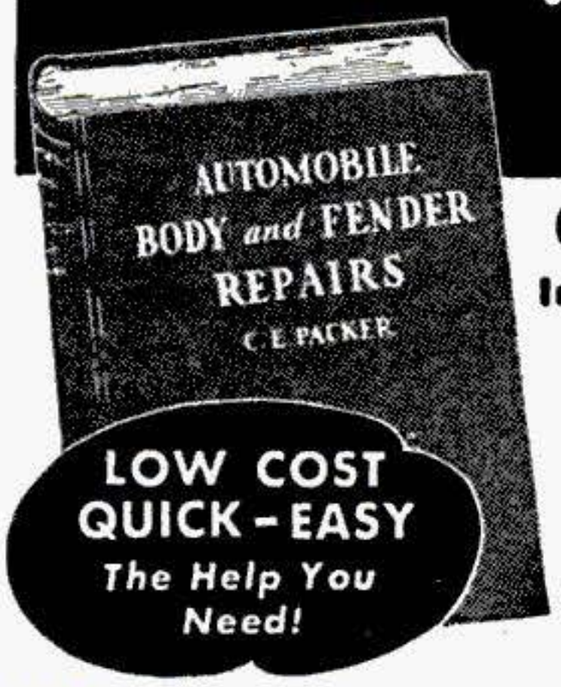
FIRE EXTINGUISHERS $4.95

A life saver in every auto, boat, home, camp-site. Order several. Be safe. CTC reconditioned. Guaranteed. 1 qt. size.

Above prices do not include postage. Order now by mail. Send no money. We ship C.O.D.

ABELL DISTRIBUTING CO. Dept. 5
4633 York Rd., Baltimore 12, Md.

Make More Money in AUTO BODY and FENDER REPAIRS



233 Pictures—Diagrams
325 Pages of Vital Facts

Covers methods, tools, materials—How to get business—How to start your own shop. Latest information and pictures.

GET THIS BOOK NOW

In Your Own Home **FREE TRIAL**
Send No Money

GET YOURSELF a share of the big money car owners are spending to keep their older cars looking good. This practical book will put you right into this profitable business. No experience needed. Get a good job or start a business of your own with little or no capital. Biggest selling book of its kind. Thousands in use. Mail coupon today—money back if not fully satisfied.

Mail Coupon

GOODHEART-WILLCOX CO., Dept. 35
2009 S. Michigan Avenue, Chicago 16, Ill.

Send Auto Body and Fender Repair, $3.50. If not satisfactory I will return in 5 days and you will refund money paid.

( ) Remittance enclosed, sent postpaid.
( ) Send C.O.D. Postage extra.

Name.....

Address.....

City.....State.....

BUY DIRECT AND SAVE

SURPLUS SUN GLASSES

CHECK these FEATURES

- Guaranteed four base lenses
- Lenses optically precision ground
- Meets all specifications for absorption of ultra-violet and infra-red rays.
- Sweat resistant plastic band
- Heavy gold plated rims
- Genuine leather case

This Glass Worth $15 During War

DO NOT CONFUSE WITH ORDINARY GLASSES **$3.95**

SATISFACTION GUARANTEED

WHITE
T-SHIRTS

- Carded combed yarn
- Extra long
- Small neckline
- Quality workmanship
- Regular 79c value

Minimum Order
12 for.....$6.50

Sizes S - M - L. Order any combination of sizes desired.

UNDERSHIRTS

- Combed yarn
- Full Swiss ribbed
- Extra long
- Regular 79c value
- Sizes 34-46

MINIMUM ORDER 12 for $5.50

FIRST QUALITY
KNIT BRIEFS

- Full elastic waist
- Generous cut
- Regular 69c value
- Sizes S - M - L

Minimum Order 12 for $5.75

ORDER ANY COMBINATIONS OF SIZES YOU WISH

MIDWEST SURPLUS DISTRIBUTORS
P. O. Box 1211 Dept. PS-102 Joliet, Illinois

Send cash, check, or money order and save C.O.D. fee. Add 25c for mailing and handling. All orders over $10 sent postpaid.

COMPLETELY SAFE

Here is the gun that will thrill every boy. When you pull the trigger, it cracks out like a real gun and smoke puffs out of the muzzle. The American Rangers Automatic is a quick acting, repeating pistol that never misses. It shoots 60 to 75 shots without re-loading. Looks like a real gun. Absolutely SAFE. Contains no explosives. Each gun comes boxed with 10,000 shots of smoke powder or enough ammunition to last a full year. This smoke powder is harmless. Will not hurt the eyes and may even be eaten. Only $1.00 each or 3 guns for $2.00. Only limited quantity available. Write for yours NOW.

SEND NO MONEY
Try 10 Days — At Our Risk

Just send name and address. On arrival deposit only $1.00 plus C.O.D. postage for one gun or $2.00 plus C.O.D. postage for three guns. If not completely satisfied return and your money refunded. Save money. If you send cash with order, we pay postage. Write TODAY.

SPECIALTIES MFG. CO., Dept. 521
1367 N. Sedgwick Chicago 10, Ill.

NEW EASY WAY TO MAKE MONEY at HOME

YOUR COST ONLY 5c
YOU GET $5.00,
FULL OR SPARE TIME.

It's easy to Bronze Baby Shoes. Business still in infancy. Get in on ground floor and skim cream of profit from rich and never-ending market. No experience needed. **Learn in one week.** Income up to $1,000 a month full time—$50 to $75 weekly in spare time. We furnish complete kit and full instructions. Simple as A B C to become an expert.

FREE FACTS. Write today. Don't send a penny. Just name and address in letter or postcard. Be the first in your territory to reap rewards waiting. Costs only 5c to bronze shoes. Sell for $5.00! This is too good to miss. Get facts today. Write to

KIKTAVI COMPANY, Dept. 25
8620 So. Ruthelen Los Angeles 44, California

AMERICAN JIU JITSU TRICKS
★ COMMANDO FIGHTING ★

Learn American Jiu Jitsu. Be a winner in clean or dirty fighting where it means do or die. Fear no man, club, knife or gun. A complete course by the world's most famous Jiu Jitsu instructor. He has personally taught many in the U. S. Army, Navy, Marine, National Guard, Coast Guard, R.O.T.C., Customs, Immigration Border Patrol, peace officers, civilians, men and women throughout the United States and Canada.

Book No. 1. A Course on
36 SECRET KNOCK OUT BLOWS and DEATH BLOWS ABOVE the WAIST WITHOUT the USE OF FISTS 25c
Just a jab with tip of fingers or strike with edge of hand and numerous nerve pressure points. 52 photographic illustrations.

Book No. 2. A course on a series of Come Along Holds that will enable you to subdue and hold any man with ease. With 45 illustrations, **50c**

Book No. 3. A Course of shaking down the Gunman, shows how you can approach and search and disarm armed persons so that they can't disarm you, regardless of how much they know of any jiu jitsu methods. 51 illustrations 50c

Book No. 4 All the latest in disarming persons with guns, knives or clubs; defense against any kind of foul attack. Also how to do dirty in-fighting, where it means your life. 108 pages, 151 illustrations, **$1.00**

You can have the complete set for only $2.00 postpaid, or sent C. O. D. plus postage in U.S.A. only. Send the four books on these latest methods of hand-to-hand fighting to a fighting man today.

THE ALLIED ARMED FORCES EMPLOYED MY METHODS
S. J. JORGENSEN, 1111-S Virginia St., Seattle, Wash.

STALL-PROOF your CAR, TRUCK, MOTORBOAT

● Here at last . . . a new automatic device to start your engine with **only** a turn of the ignition switch. Will start the engine **automatically** when unintentionally stalled! The START-O-MATIC is easy to install on most cars . . . comes complete with full instructions. Will last indefinitely with no maintenance. Does not affect normal running of engine. 10 DAY MONEY BACK GUARANTEE. Dealer inquiries invited. Stall-proof your car today with a START-O-MATIC!

COMPLETE *Give make, model and year when ordering.*
$19.85 **WALTER L. WRIGHT COMPANY**
5 Court Square, Long Island City, New York

TALK-SING *thru your own radio* *with* **RADIO MICROPHONE**

Be the life of the party. Put on your own broadcasts at home. Talk-Sing, make announcements from any room. Wonderful voice practice. Microphone easily attached to any radio. Follow enclosed instructions. SEND NO MONEY—pay Postman $2.25 plus postage. Send Money Order or check and save postage.

EMPIRE RADIO & TELEVISION CO. (Dept. S.I.) 1521 Bedford Ave., Brooklyn 16, N. Y.

Say You Saw It In Popular Science

LOCKSMITHING & Key Making

PRACTICAL UP-TO-DATE COURSE

Easy-to-learn modern information for self-instruction. How to work on locks, pick locks, de-code, make master-keys, repair, install, service, etc. For every handyman, home owner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 plain illustrated lessons. Full price only $3.95. SEND NO MONEY. Just pay postman plus C.O.D. postage. Or send $3.95 with order, we'll ship postpaid. Satisfaction guaranteed or refund. Address below.

WATCH & CLOCK REPAIRING

Learn at Home in Your Spare Time! . . . Prepare for a happy future, with security—and qualify for a good job NOW. A fascinating and thorough self-instruction training in American and Swiss watches and clocks. Special section on alarm clock repairs. Fast-growing field. Satisfaction is guaranteed. Full price only $4.95, postpaid—or COD plus postage.

Nelson-Hall Co. 1139 S. Wabash Ave., Dept. E-01, Chicago 5, Ill.

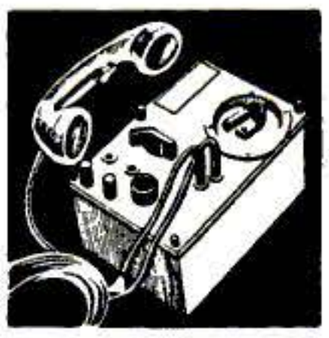
Copyrighted material

WAR SURPLUS BARGAINS

TYPE A3 BOAT

Five-man A-3 boat complete with oars, carrying case, bailing bucket, sea anchor and adaptor to fit auto pump. Excellent and tested..... **$19.50**

TELEPHONE with REMOTE CONTROL UNIT



Simple to install. No external power required. Several units can be used on one hookup. Not a toy but a real telephone which will work up to 50 miles. Can be used with handset. Complete with handset. Excellent and tested. NEW—Only..... **$11.50**

Above Items FOB Fresno—Send 25% Deposit on COD's

SENSATIONAL $2.00 SPECIAL (We pay postage in U.S.A.)

1 ea AAF Flying Helmet	1 pr AAF Flying Goggles
1 ea AAF Oxygen Mask	1 ea High Speed Drill
1 ea AAF Gunsight Mirror	1 can Pyrethrum Powder 2 oz.
1 pr Eye Shade, Dark	1 roll Adhesive Tape 1"x5 yd.
1 pr Eye Shade, Clear	1 ea Polishing Cloth, Eye Glass
1 ea Pocket Comb 7"	1 ea Carpenter or Mechanic Apron

All Items NEW—Delivered to you for only **$2.00**

FORTUNE & SHAW

2250 McKinley Dept. A Fresno, Calif.

TRAIN

Your VOICE!

Results GUARANTEED

We build, strengthen the vocal organs—not with singing lessons—but by sound, scientifically correct silent and vocal exercises and absolutely guarantee complete satisfaction with results. Write for Voice Book, FREE. Sent to no one under 17 years old unless signed by parent.

Perfect Voice Studios, Studio 1365, Kimball Hall Bldg., Chicago 4, Ill.

FLOYD CLYMER'S unbiased book

"INDEPENDENT TEST REPORT ON KAISER-FRAZER CARS"

Read what 3000 owners now think of their K-F cars. Expert, part-by-part analysis. 100 photos. Tells all. 3000-mile test run, Pike's Peak closed car record, gas mileage. Thousands are buying. Order now. $1.50 postpaid. $2.50 deluxe ed. Cash, money-order, or specify C. O. D. Money-back guarantee. Clymer, Publisher, Dept. PS-5 2125 W. Pico, Los Angeles 6, Calif.

RE-STRING RACKETS AT HOME

• EARN MONEY •

WITH THE WONDER VISE

It's pleasant, profitable work. No experience or skill required. Easy to learn. Full line of guaranteed **Stringing Tools, Frames, Gut and Silk Strings.** Every item high quality.

FREE Write for our 1948 Catalog and Instruction Sheet.

W. A. BICKEL & CO.

803 South Boulevard, Dept. A-52 Oak Park, Ill.

How to Make Liquid Marble

And BIG PROFITS In Your Own Business

Amazing Liquid Synthetic Marble can be made at home without machinery. Needs no heat or pressure. Can be poured into molds for casting expensive novelties. Liquid Synthetic Marble can be made in any color. It is even *more beautiful than genuine marble* because of its highly glazed finish. Costs far less. **FLEXIBLE MOLDS:** Make your own Flexible Molds. Cast novelties, statuary, desk sets, book-ends, etc. out of Liquid Marble, plaster and many other molding compositions. A large sized mold costs but a few cents. Hundreds of casts can be taken from a single mold. **UNLIMITED MARKET:** You will find steady year-round demand in your own community. No selling problem. We supply names of buyers for your finished products. Let **BING PRODUCTS** show you how to start with a small investment and build a permanent, independent, profitable business! Write now for **FREE CATALOG!**

BING PRODUCTS: Dept. PS-5A 88 BROAD STREET BOSTON 10, MASS.

SAVE $64.00 AND UP!

Pneumatic Air Tools

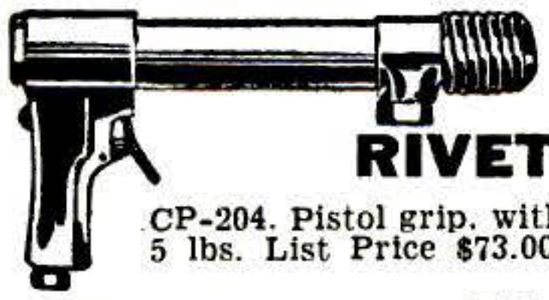
Ideal fender and bumping hammers, for riveting brake lining, for concrete breaking, and many other uses. Like new. At these unheard of low prices it pays to order a good supply.

RIVETER & CHIPPING HAMMER

Ingersoll-Rand AVC-11 with air control, push button throttle, takes up to 5/32 rivet. Like new. Weight 5 pounds. List Price $73.00—Special Price..... **$7.95**

RIVETER & CHIPPING HAMMER

Chicago pneumatic CP4 with air control, push button throttle, takes up to 3/16 rivet. Weight 6 lbs. List Price $73.00—Special Price..... **$8.95**



CHICAGO PNEUMATIC ONE SHOT RIVET HAMMER

CP-204. Pistol grip, with air control. Weight 5 lbs. List Price $73.00—Special Price..... **$9.75**

THOR PNEUMATIC

Alligator Squeezer and Compression Riveter

Model PRS-10, Alligator jaws, or PRS-10, "C" Type Yoke. Weight 5 lbs. List Price $93.00—Special Price.. **$12.95**

Prices are F.O.B. Chicago. Immediate delivery. SOLD ON MONEY BACK GUARANTEE. Send check or money order today.

DEALERS—WRITE . . .

C & M EQUIPMENT COMPANY 1831 S. State St., Dept. B-5, Chicago 16, Ill.

BE A REAL ESTATE BROKER

FREE BOOK TELLS HOW

Start and run your own business *Quickly*. All phases of business taught in Home Study or Classroom—Both G. I. Approved. WRITE TODAY for Big Illustrated Book. **WEAVER SCHOOL OF REAL ESTATE, 15 East Pershing Road, Dept. PC, Kansas City 8, Mo.**

LOOK! It actually Flies—this NEW model

HELICOPTER

Jet model—soars up 100 ft.—a string operates it. Aluminum, with 12-inch rotor, only $1.69 complete. Send $1 with name and address. Pay postman balance of 69c plus postage. Order now.

ROBERT SALES, Dept. K-4
727 Hennepin Ave. Minneapolis, Minn.

LEARN CELESTIAL NAVIGATION

COMPLETE COURSE OF INSTRUCTIONS AND VALUABLE ACCESSORIES GIVEN FREE WITH $200.00 SEXTANT

ALL FOR ONLY **$17.50**

IT'S A ONCE-IN-A-LIFETIME VALUE!

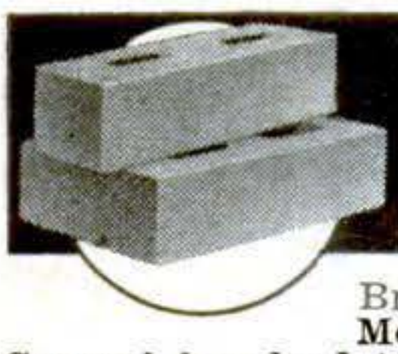
Learn navigation from same course as used by the Gov't to train our birdmen. Take readings from the sun or other heavenly bodies from your porch or back yard to determine your position within a few feet on land; within a mile when on a ship at sea.

GENUINE LINK PRECISION SEXTANT

This famous (war surplus) Sextant originally cost $200.00. You can buy it now for only $17.50 and with it we will give you the instruction course on Celestial Navigation; also complete sextant instructions, and if you ask for them, an 18 in. wood navigation scale and 18 in. wood navigation dividers. These will not be sent unless you request them. Sextant is fitted with night lighting attachment, easy reading vernier scale and good indicating bubbles. Slightly used but guaranteed perfect. Carrying case included. Shp. Wgt 12 lbs. Send check or money order. Only..... **$17.50**

AERO PARTS SUPPLY, Dept. PS5
Municipal Airport Houston 17, Texas

Copyrighted material



More Local Manufacturers are Needed-NOW

Brikcrete is sweeping the country. More local plants are badly needed. Several hundred territories are being opened up for local Brikcrete manufacture by men of vision and aggressiveness. Brikcrete ties in with today's huge building program. Makes possible better construction at lower cost. Truly better than brick; actually cheaper than lumber. Combines strength, safety, insulation value, colorful beauty.

World's Most Modern Masonry

Brikcrete is made in locally owned plants, using local materials and local labor. That's why high quality and low price still permit a 100% to 150% mark-up. We supply complete equipment; easy terms if required. Generous cooperation. Exclusive manufacturing privileges in protected territory. Write or wire for information.

BRIKCRETE ASSOCIATES, INC.
4675 S. Division, Grand Rapids, Mich.

BRIKCRETE

FORMATION STICK

HERE'S a gadgeteer's paradise! Think of it—innumerable gears and resistors, a potentiometer and a centrifugal governor—all yours for the "taking apart." This is the formation stick originally used in conjunction with the Automatic Pilot. A bargain in hard-to-get precision parts, hours of fun for you. Only $1.95 complete (add 40c to cover postage and handling). No C.O.D. orders. No orders accepted outside U.S.A. and possessions. We guarantee satisfaction.

N. SILVERSTINE CO.
6532 EAST McNICHOLS ROAD DETROIT 12, MICHIGAN
"Seven Acres of Surplus"

!!! HOW TO WIN SUCCESS !!!

SUCCESS comes to those who have the Know-how!!! And this applies to You! YOU must clearly understand current business terms and uses!

DO YOU KNOW?

BUYING • **TRADEMARKS** • TRADE ACCEPTANCES • SELLING • **PATENTS** • **COPYRIGHTS** • EXPORTS • IMPORTS • MONEY • FINANCE • LETTERS OF CREDIT • TERMS OF PAYMENTS • ADVERTISING • FACTORS

Just a few of the 70—short—to the point—informative paragraphs in Philip E. Ohlson's booklet "Business Fundamentals." His experience with General Motors, National Carbon and Allied Chemical Corporations permits him to reveal business "Facts." Every person—man or woman—needs "Business Fundamentals" to compete in life—to help make and to save money—and to know sound business practices. Millions of dollars lost yearly with heartaches and headaches when a little advance business knowledge is the solution.

This is a "MUST" purchase by every person wishing to handle business transactions with good American Horse Sense! SEND NO MONEY—Pay Postman $1.00 each plus postage or send $1.00 and we pay postage.

MAIL COUPON TODAY

OHLSON DIVISION, Dept. P
2416 Bridge Plaza
Long Island City 1, N. Y.

Please mail.....copies "Business Fundamentals." I will pay Postman **$1.00** each plus Postage.

Name.....

Address.....

City.....State.....

SUPER QUALITY

Surplus Sale

VISES and CLAMPS For Mechanics & Home Craftsmen

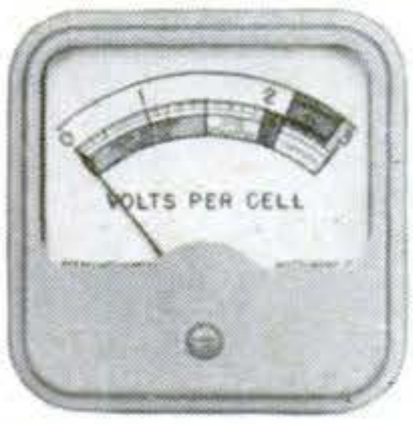
Never before such values! First time these *nationally famous* tools are offered direct-by-mail. Brand new — rugged. None finer.

ALLOY STEEL VISE: Combination swivel and bench type base. 3½" superhardened serrated steel jaws open automatically to 4½" by trigger action. Quick ratchet screw closing; built-in pipe grip. Many other features. Regular price $24.30. **Now only $14.95**

DUAL GRIP MALLEABLE IRON CLAMP: Holds on any surface - won't shift or creep. Two sizes: 3" opening (was $4.00) now only **$1.95**. 4" opening (was $4.50) now **$2.25**

ORDER TODAY - quantity limited. Enclose check or money order. We pay shipping charges. *10 day money back guarantee.*

ALL BUSINESS COMMODITIES, INC.
Dept. AG. 4656 W. Rice St. Chicago 51, Ill.



CAR BATTERY TESTER

Checks voltage of individual storage battery cells under operating conditions. Red, yellow, and green areas indicate satisfactory or unsatisfactory operation while under load, no load, or charging. Calibrated scale 0-3 volts. Will check flashlite or #6 dry cells. 2¾" square.
Stock No. MVD-25..... **$2.00** post-paid

DUBIN ELECTRONICS CO., Inc.
Dept. PS-5, Box 68, Corona, New York

Send for Amazing New 144-Page Catalog of

ART SUPPLIES!

Gold mine for professional or amateur! Complete descriptions of all items used by artists; prices; full index. Yours for only $1—refunded with first order. Also entitles you to professional consultation by Toby Moss, noted art director. Offer limited; act now! Write Dept. P1.

ZEAL-ART Inc., 20 E. 49th St. New York 17, N.Y.

RUPTURE SUFFERERS GET RELIEF

Get comfortable, safe relief with scientific support. Soft, sanitary material gives natural support with real comfort to active wearers. Satisfaction guaranteed. For free literature write:

WEB TRUSS CO.
Dept. S-8, Hagerstown, Md.

Say You Saw It In Popular Science

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands. Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. Big chain store orders now being placed. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

Copyrighted material

Men's Fully Guaranteed NEW $13.95 PLUS TAX

15-JEWEL WRIST WATCH

ORIGINALLY sold up to $55

Sacrificed because they're post-war surplus

LOOK AT THESE FEATURES:

Luminous dial . . . sweep second hand . . waterproof . . . shockproof . . . anti-magnetic . . . imported Swiss precision movement and case.
You get them now for a small fraction of original prices. Don't delay! Order now . . . while they last. **Send only $1** down payment with order. Pay balance to postman on arrival, plus postage. Or we pay postage if you enclose $13.95 plus $1.39 Fed. Tax.

Receive Reg. $2 expansion band FREE with prepaid order. Money back in 5 days if not delighted. Order now.

MARYLAND DISTRIBUTORS, Dept. 58
501 E. Balto. St. **Balto. 2, Md.**

Be an INVESTIGATOR

JAMES S. BOLAN, FORMER POLICE COMMISSIONER OF NEW YORK CITY offers MEN & WOMEN an attractive opportunity to prepare for a future in *Investigation & Criminology* by comprehensive Home Study Course. Free placement service assists graduates to obtain jobs. APPROVED UNDER G. I. BILL OF RIGHTS. Write for Free Booklet PS.

THE BOLAN ACADEMY, INC.
EMPIRE STATE BLDG., NEW YORK 1, N. Y.

SUPER-MITE RADIO

STANDARD BROADCAST • **NEW 1948 MODEL** • SHORT WAVE

PACKS AMAZING POWER!

$5.99

SUPER-MITE FEATURES

- World's most powerful midget radio
- Uses war-born midget electronic tubes
- Over 2,000 mile broadcast range
- Overseas short-wave reception
- Powered by pen-cells or midget battery
- Portable, for campers, hikers, etc.
- Picture diagram for radio beginners
- No experience needed to wire set

New Custom-Engineered 1948 Model has variable tuning and patented adjustable short-wave coil. Brilliant red chassis, silver and black dial, streamlined control knobs. Complete set ready to wire $5.99 Post Paid. Tubes 95c each.

SUPER-MITE JR. POWERFUL 1948 MODEL $3.99

Miracle War-Born midget tube gives this tiny one tube set over 1,000 mile broadcast range. Brilliant red crackle finished chassis, special tuning coil and powered by pen-cells or midget battery. Complete set with beginners picture diagram Only $3.99 Post Paid. Special electronic tube 95c

Electronic Research, 1216 Park Row Bldg., New York City 7

WAR SURPLUS PHOTO PAPERS & FILMS

HEAR THIS!
CLOSE OUT SPECIAL

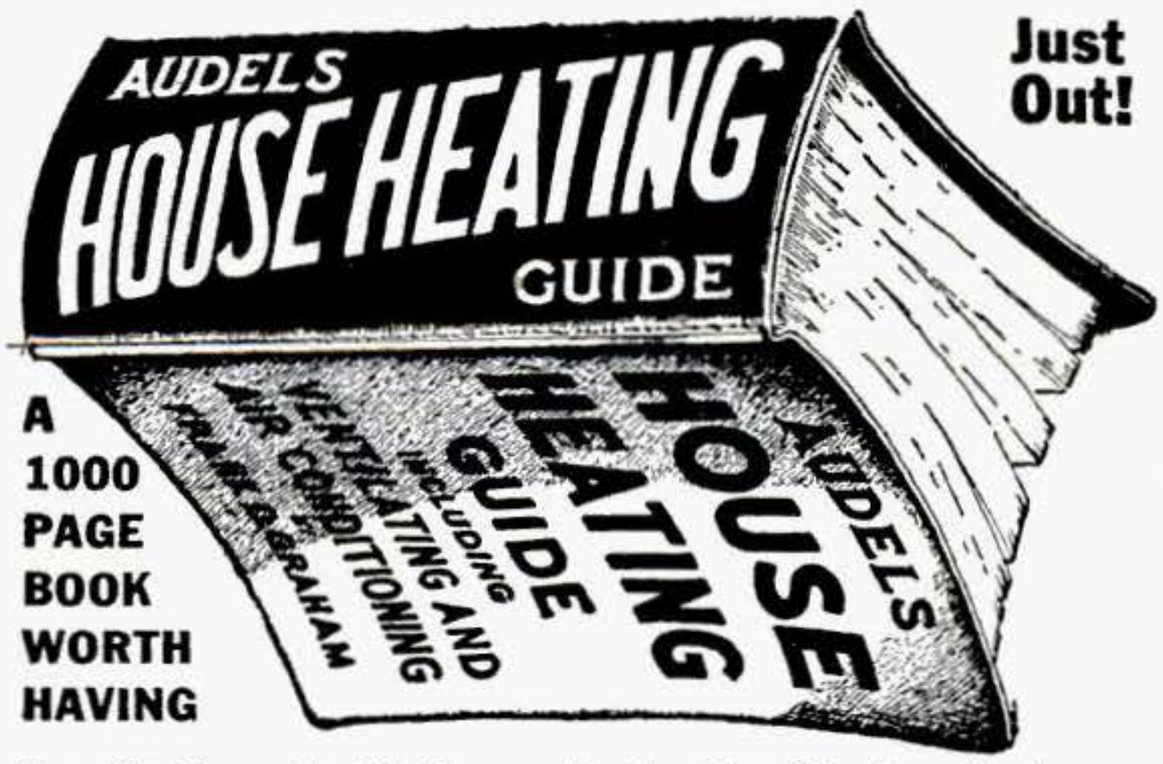
All 1946-47 dating. Tropical overseas packing. Guaranteed to be as good as the day manufactured. Sold strictly on a money back guarantee basis.

4x5 E.K. Aero Contact—S.W. Contr. 1 & 2		
Minimum 3 gross	gross	47c
10 gross lots	gross	35c
7"x125' E.K. Aero enlarging S.W. semi-gloss Contr. 1-2-3-4	roll	$1.25
9⅜"x200' E.K. Aero enlarging S.W. semi-gloss Contr. 1-2-3-4	roll	1.95
9⅜"x200' Defender Velour Black enlarging semi-matte Contr. 2-3-4	roll	2.50

Send check, money order or cash. 25% Deposit required on C.O.D. orders. All prices F.O.B. Culver City, Calif.

AIRBORNE SALES CO., INC. DEPT. PSM 5-8 CULVER CITY, CALIF.

Just Out!



A 1000 PAGE BOOK WORTH HAVING

For Heating, Ventilating and Air Conditioning Engineers, Plumbers, Maintenance Men, Contractors, Building Superintendents and Mechanics seeking practical, authentic information on Heating, Ventilating, Air Conditioning. 1000 Pages—910 Illustrations—57 Chapters explaining the working principles of all Modern House Heating, Ventilation and Air Conditioning systems. Fully illustrated and indexed. This up to date book of reference gives answers to 1001 questions on Heating, Ventilating, Air Conditioning & Radiant Heating.

$4 COMPLETE • PAY ONLY $1 A MONTH

To get this assistance for yourself, fill in and

—MAIL ORDER—

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

MAIL AUDELS HOUSE HEATING GUIDE for free examination. If O. K. I will send you $1 in 7 days; then remit $1 monthly until price of $4 is paid. —Otherwise, I will return it.

Name _____

Address _____

Occupation _____

Employed by _____ P.S.M.

AUDELS Carpenters and Builders Guides

4 vols. $6

Inside Trade Information

for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail FREE COUPON below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint.

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

Mail Audels Carpenters and Builders Guides, 4 vols., on 7 days' free trial. If OK I will remit $1 in 7 days and $1 monthly until $6 is paid. —Otherwise I will return them. No obligation unless I am satisfied.

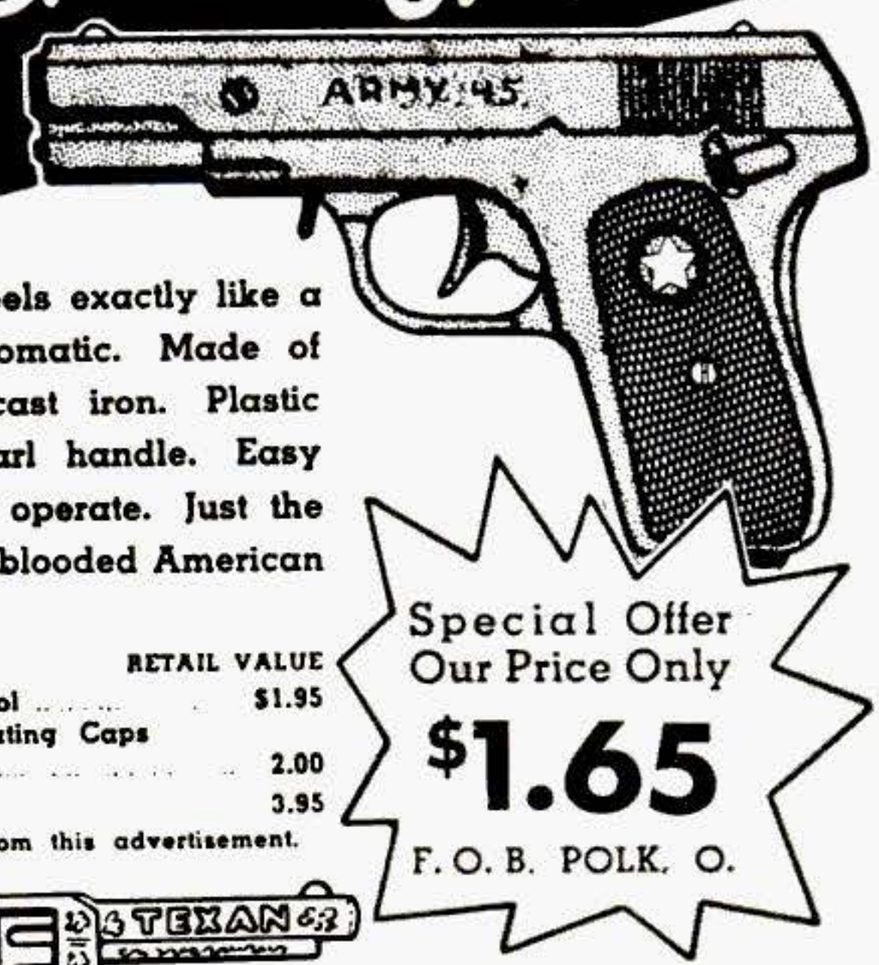
Name _____

Address _____

Occupation _____

Employed by _____ P.S.M.

Special- CAP PISTOL OFFER



Looks and feels exactly like a real '45 Automatic. Made of heavy die cast iron. Plastic imitation pearl handle. Easy to load and operate. Just the thing for red blooded American Boys.

	RETAIL VALUE
1 Army '45 Pistol	$1.95
20 Boxes Repeating Caps (5,000 shots)	2.00
	3.95

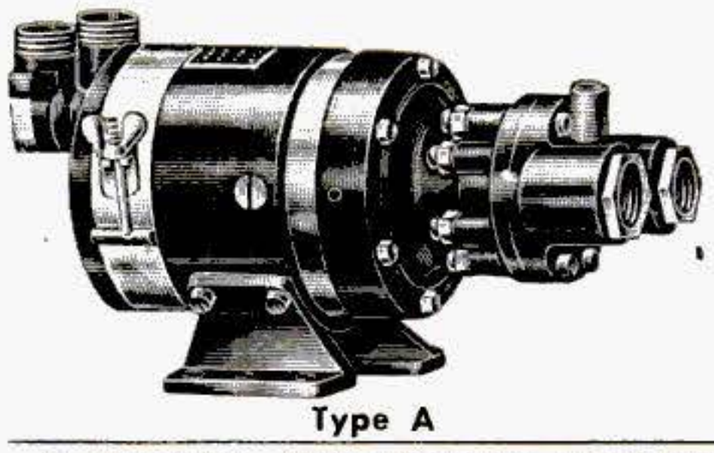
Order direct from this advertisement.

Special Offer
Our Price Only
$1.65
F. O. B. POLK, O.

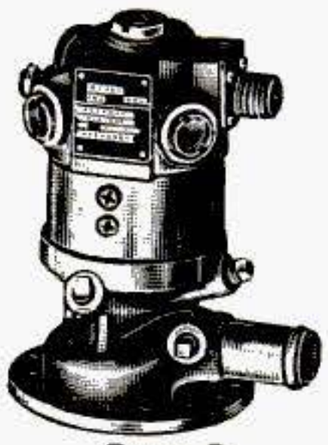
Also, be sure to send for our new bargain pistol and cap circular. See the new Texas, Silver Pony, Spitfires, Captains, Long Tom's and lots of others. Also Holsters.

SPENCER FIREWORKS CO.
151 MAIN STREET, POLK, OHIO

RARE PUMP BUYS
• FOR HOME, FARM, RANCH OR SHOP •



Type A



Type B

A—High Cap. Hydraulic Pump. **Lifts water 20 ft. Cap. 3½ gals/min. at 600 psi.** For 24/32V DC/AC. (75% cap. on 12V). Will run on 110V with line resistance. **Brand new** in original cartons. **Bendix 389-2A, Each, FOB Chicago** **$10.00**

B—Motor-driven Centrifugal Booster Pump. **Lifts water 4 ft. For 24V DC/AC** and 110 V with line resistance. **Brand new** in original cartons. **Thompson TFD 8200, Each** **$17.50**

SURPLUS ASSETS CORP.
2315 W. OGDEN AVE., CHICAGO 8, ILL.

New...Self-Contained
SPRAY GUN

No Hose! No Tanks! No Pumps! No Motor!

It's true! A high-pressure spray gun as self-contained, as compact and portable, as a flashlight! Uses no current. Pressure comes from inexpensive CO2 cartridge. A cartridge sprays 10 to 20 oz. of liquid (depending on viscosity). Use gun for paints, liquid insecticides, oils, etc. For home, farm, workshop, garden, garage. Comes with 3 cartridges. Fully guaranteed. The Becker Spray Gun is shipped postpaid for only $18.50; or send only $2—we'll ship C.O.D., you pay postman balance plus postage. Extra cartridges, 10 for $1, postpaid.

$18.50
(With 3 cartridges)
POSTPAID

SULLIVAN-BECKER CO., Dept. 128-E, Kenosha, Wis.

V-8 DUALS & SINGLES

DEALERS WANTED

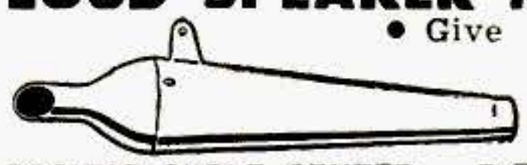
MUFFLERS
STEELS and ALUMINUMS with a motorboat tone

SINGLES, Chev., V-8, Plymouth, Steels $5.50, Aluminum $7.00. Chry., Olds., Buicks, etc., Steels $7.50, Aluminum $9.00. V-8 and MERCURY DUALS, Steel $17.50, Aluminum $21.00. Split Manifold Sets, Steels $35.00, Aluminum $45.00. Aluminums are guaranteed for life of your car.

SANDEE MUFFLER CO.
BOX 296 LA TIJ., LOS ANGELES 43, CALIF
2624 W. SLAUSON AVE., LOS ANGELES, CALIF.

LOUD SPEAKER MUFFLERS

for British and American Cycles



• Give Name—Make—Model when ordering. Free Catalog on ALL Cycle Accessories.

15.00

PACIFIC CYCLE CENTER D-58 1208 Pine St., Seattle, Wash.

DUAL TAIL PIPE EXTENSION

Pat. Pend.

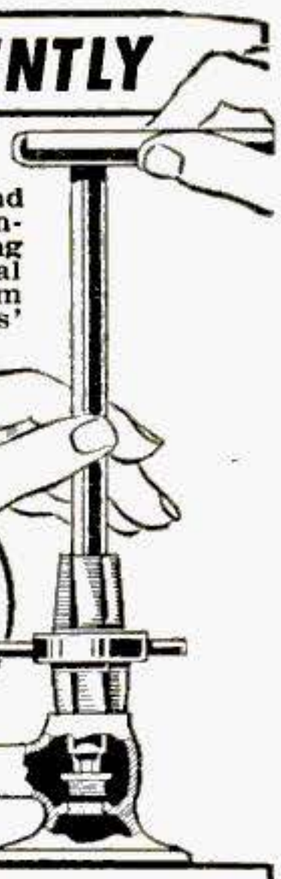
Fits all cars—chrome plated

DEEP TONE
produced by 2½ inch outlets
Postage free on prepaid orders
DEALER INQUIRIES INVITED

$2.95

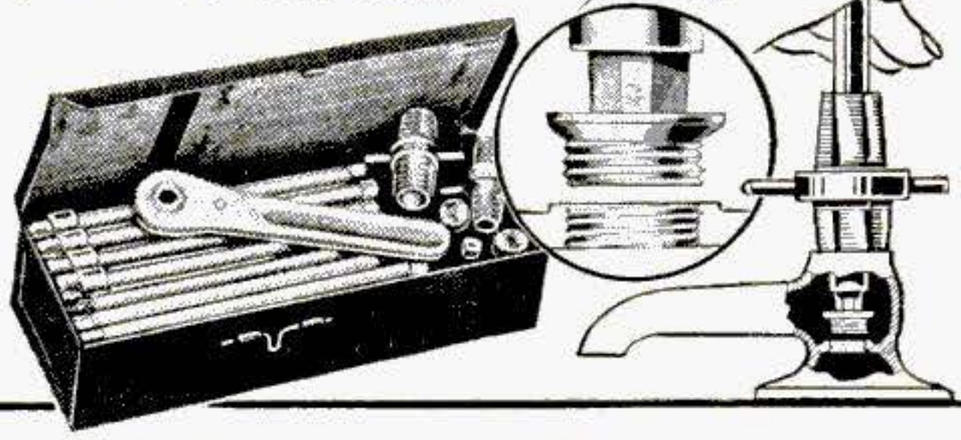
LYONS PRODUCTS COMPANY
2319 Ridgeley Drive, Dept. PS-5, Los Angeles 16, Calif.

STOPS LEAKS *PERMANENTLY*



Cut your fixture replacement, water and fuel bills with Economy Renewable Seats. Make economical, permanent repairs quickly and easily with the Junior Kit (illus.). Repair bathroom, kitchen and laundry fixtures. Everything you need included in steel box. This is a natural for the "Fixit" shops—get extra income from making permanent repairs on your customers' faucets.

Senior Master Kit also available—repairs faucets and valves up to 1" pipe. *At better Jobbers and Hardware Stores . . . or Write Direct.*



ECONOMY VALVE SEAT CO.
2811 W. Fletcher Street Chicago 18, Ill.

NEW! MINIATURE DUST MASK

Wear when sanding, grinding, paint spraying, sweeping, dusting, furnace cleaning, etc. Handy as a pair of glasses. Just keep mouth closed and breathe through nose is all you do to operate. Protects against nuisance dusts, lint, coal, cement, grain dust, Hay Fever Pollen. Has 9 sq. in. filter.

For EYE protection against paint spray, dusts, gases, fumes, smoke, order our Fog-Proof Rubber GOGGLES . . . . . *$2.00 p.p.*

Order Today **$1.00** POST PAID

JERRY BRYANT, Dept. PS, 919 N. Michigan Ave., Chicago 11, Ill.

MICROSCOPES SUPPLIES-ACCESSORIES & SCIENTIFIC INSTRUMENTS
BEL SPENCER **NEW & USED** LEITZ ZEISS
BOUGHT·SOLD·EXCHANGED·REPAIRED
MEDICAL INDUSTRIAL AMATEUR
Send for **FREE LIST**
NATIONAL SCIENTIFIC INSTRUMENT CO. 119 CHAMBERS ST NY7

D. C. CONVERTERS

Eliminates need for tricky, expensive rewiring of war surplus radios, motors

110 volt A.C. to 24 volt D.C. power pack for only $15.95

Direct current to operate WAR SURPLUS radios, charge storage batteries, operate small electroplating units, now available to you direct from manufacturer at low prices you can afford to pay. Ideal for fractional horsepower motors, solenoids, relays . . . anything designed for direct current.

Each unit utilizes full-wave bridge type selenium rectifier, transformer, circuit breaker, on-off switch. **Ready to plug in and use.**

24 volts output at 4 amperes $15.95
24 volts output at 10 amperes 26.45
6 volts output at 4 amperes 11.45

Above prices FOB factory, shipments are made by express, freight collect. Check or money order must accompany all orders.
Send for illustrated price list.

SCINTILLA RAIL AND POWER WORKS, Inc. 54 MacDougal St. New York 12, N. Y.

¼-TON ARBOR PRESS

Ideal for straightening, bending, light stamping, riveting, staking, production assembly and general presswork. Used ten years in plants and shops—bushings, cameras, reels, typewriters, instruments, light molding, etc. Grey iron castings. Height 7½"; over table 2½"; over base 4¾"; ram 5/16" x 7/16"; ram travel 2¼"; approx. pressure 500 lb. Weight 7 lb.

$9.50 POSTPAID U.S.A., MONEY-BACK GUARANTEE.

H. D. HERDER, Tool Specialties
2426 Brook Dr. KALAMAZOO 82, MICH.

Make BIG MONEY . . . in PLASTICS

Send for FREE CATALOG

WRITE NOW!
No obligation

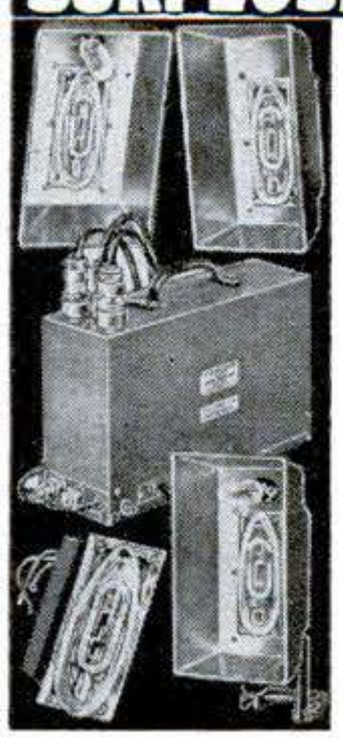
Learn how YOU can start your own profitable Plastics business for just a few dollars. No experience necessary, we teach you how, furnish you with all supplies and Marketing Helps. This is your opportunity! DON'T DELAY!

COLONIAL PLASTICS CO. • **216 S. 7th St., St. Louis, Mo. Dept. S1**

LEARN EXPORT

Buy and sell world-wide without capital. Travel abroad if desired. Export men and women in demand. Your own business — **profits unlimited.** Salaried jobs — up to more than $10,000 a year. Practical, low cost WORLD TRADE COURSE teaches you quickly at home in spare time. No previous special experience or schooling needed. World Trade Certificate awarded. Write today for FREE DETAILS. No obligation. Please state age. Airmail reaches us overnight. **THE MELLINGER CO., Exporters-Importers, 1422-S Westwood, Los Angeles 24, Calif.**

WAR SURPLUS BARGAIN *FLASH* EQUIPMENT KIT



FAMOUS "MODEL 1503" AIRCRAFT FLASH UNIT powerful high quality equipment made for U. S. Air Corps will be shipped brand new in original boxes.

POWER SUPPLY built into beautiful gray finished case, with all connectors, relay control, 2 condensers each 2000 Volts, 50 M.F.D. light output 110 Watt seconds, can be used with any 12 watt battery as a professional studio flash equipment. Power pack alone is worth more than the price we are asking for the complete unit.

FOUR HIGH SPEED FLASH TUBES plastic sealed, unbreakable, 12 million peak lumes light output for more than 15,000 flashes.

WE INCLUDE aluminum reflectors, transformer, connectors, connecting cords, spare parts, diagram and instructions on how to convert the unit for 110 Volt A.C. Converting parts included.

IT IS THE BEST VALUE IN WAR SURPLUS MATERIAL WHILE THEY LAST.

PRICE complete $68.00

CINEX INC., Dept. S.P.
165 West 46th St. New York 19, N. Y.

22 Models

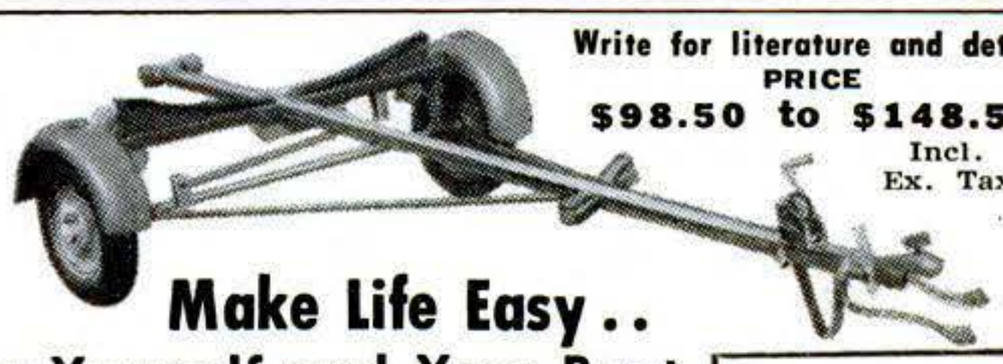
TO MEET THE NEEDS OF *ALL* SOFTBALL PLAYERS

To play better softball in 1948 be sure to use a genuine Louisville Slugger softball bat. H & B's "Softball Rules" for 1948 is ready at your dealers. See him for your copy or send 10c direct to us (stamps or coin) to cover mailing. Address Dept. Z-34 Hillerich & Bradsby Company, Inc., Louisville 2, Kentucky.

LOUISVILLE SLUGGER
HILLERICH & BRADSBY Co
LOUISVILLE, KY.

get yours for '48

LOUISVILLE SLUGGER BATS *for* BASEBALL and SOFTBALL



Write for literature and details
PRICE
$98.50 to $148.50
Incl. Ex. Tax

Make Life Easy . .

For Yourself and Your Boat

● The Tee-Nee Boat Trailer takes the work out of boat handling . . . makes it a simple, one-man assignment at all times, under all conditions. It lifts your boat and sets it down, loads, launches, lowers and raises down and up embankments. Of vital importance, too, the keel of your boat is protected against damage or distortion, while trailing or in storage, by resting firmly along the steel trailer tongue. You owe it to yourself and your boat, to settle only for a Tee-Nee.

TEE-NEE TRAILER CO.
211-PI
E. Indianola Ave.
Youngstown, Ohio

Copyrighted material

Order Today! Send No Money!

Save! WAR SURPLUS

For work! For play! For sports!

NEW! O.D. PITH HELMETS

They're brand new, genuine U. S. Army helmets with adjustable leather band. Fit any size. Keep cool on hottest summer days. **$1.00**

FREE! Genuine Air Corps overseas cap sent **FREE** with order over $2.50.

Brand new! Pneumatic

DUAL TUBE LIFE BELTS

Simple to inflate. A child can do it. Use as float, raft, mattress, head rest, canoe safety and other uses. . . . **$1.00**

U. S. Air Corps Style

SUN GLASSES

Prevent eye strain due to sun glare. 4 base polished ground lenses in gold plated frames. Perloid sweat bars and nose pads. GUARANTEED FOREVER. Certificate with each pair. . **$2.49**

Relax Outdoors! Enjoy Your Summer!

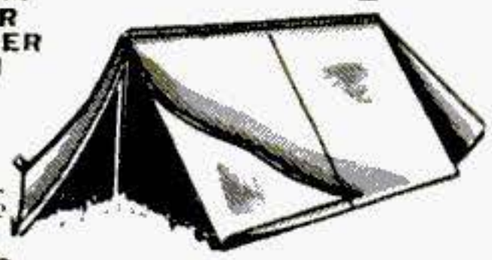
Genuine U.S. Army **JUNGLE HAMMOCKS**

Spacious, sturdy, comfortable. Complete with protective nylon net. Used by the armed forces in all insect infested regions. With rainproof overhead guard. **$4.88**

Mae West Life Preservers

Issued but not used. Fit over head. Inflate quickly by mouth or CO_2 cartridge **$1.88**

WRITE FOR FREE SUMMER BULLETIN



Sleeping **BAGS**

100% Wool. Mummy type bags with zipper opening. **$2.88**

FOLDING CANVAS COTS

Made with heavy 16 oz. duck on sturdy frame. Used perfect cots. For outing, camping, etc. **$3.88**

5 MAN RUBBER BOATS

Complete with 4 oars and pump. Roomy, well made collapsible boat made for and to strict U. S. Army specifications **$39.00**

For Outdoor Comfort

Shelter Halves

for a set of 2.... **$2.95**

These perfect tent halves are ideal for your summer outdoor life. Two halves make a complete tent. Sold without poles.

Write for prices on other types of U.S. Army tents.

SEND NO MONEY Pick your items and send order with name and address today. Pay postman when package arrives, plus C.O.D. fees. WE GUARANTEE YOUR SATISFACTION ON FULL FIVE DAYS TRIAL.

Address Your Orders to: Dept. S-5

INTERNATIONAL SALES CO.

657 W. MADISON ST. • CHICAGO 6, ILL.

Say You Saw It In Popular Science

T-44A MICROPHONE (AAF) Sensitive diaphragm type with 5½ ft. cord. PL-179 plug & JK-26 jack. BRAND NEW . . . . . **$ .69**

WHIP ANTENNA. 9 ft. flexible, lightweight (8 oz). 10 sections. OD weatherproof finish. Only . . **1.25**

HEADBANDS for standard phones. Sturdy fabric covered bronze spring wire. Thumb screw adjust. forks . . . . . **.39**

45V. BATTERIES (Ray-O-Vac). 22½V. tap. Standard radio "B" supply. Not currently dated but volts & amps. guaranteed. Binding post terminals. Shpg. wt. 2 lbs. Ea 49c—6 for **2.49**

EXPERIMENTAL TUBES. 20 asstd. receiving types for testing, research, etc. Filament tested **1.00**

AC-DC BLOWER. Bakelite housed 24 blade 2" fan. 7000 RPM ball-bearing motor operates on 110V. with 100W bulb (or equiv.) in series or on 27V. 2 mtg. brackets. O.D. 3" x 4½". Shpg. wt. 3 lbs **3.95**

ALNICO "U" MAGNET. Polished poles ¾"x⅝"x⅝" high. 3/16" gap w/rubber grip. Only. ea . . . . . **.39**

Send for latest illustrated ALNICO MAGNET supplement

Get on Our Mailing List—Always Something New.

Min. order $1.00 Please add sufficient postage

LEOTONE RADIO CO. 67 Dey St. N. Y. 7, N. Y.

TOOL STEEL

DRILL ROD

$1.95 POSTPAID IN CONTINENTAL U.S. C.O.D.'S ACCEPTED

25 Rods SAMPLE KIT 25 Sizes

Ground and Polished to a Perfect Finish

1001 Uses for Craftsmen, Hobbyists, Mechanics, etc.

Ideal for Making

PUNCHES CHISELS ENGRAVING TOOLS SHAFTS, ETC.

Free machining, easily worked, yet can be made file hard or hardened to spring temper. Hardening instructions included: **Entire kit $1.95**

FLAT TOOL STEEL

The Precision ground flat tool steel with the satin-smooth finish. Simple to work, easy to harden, ready to use. **Shop Assortment $4.80.** *(5 dif. Pieces—1/32" to ⅛" thick, ½" wide; 18" long.)*

BOTH KITS $6.50

Complete range of sizes and shapes in **steel, aluminum, brass** and **stainless steel** for every need. NO EXTRA CHARGES for cutting, shipping, warehousing, etc.

Include 25c postage on orders under $5.00.

FREE

With Every Kit or first order 6" Steel comb. rule and depth gage with pocket clip and latest price list.

BESSEMER STEEL COMPANY of AMERICA

Dept. CE-17 • 3417-25 27th St. • Chicago 23, Ill.

ITEMS WANTED

From INVENTORS

MANUFACTURERS • EXPERIMENTALISTS

We are responsible company interested in items which sell from 15c to $15.00. Will buy for cash or royalty. Will answer if yours is a workable idea in drawing form, or finished product with molds, tools, dies, etc. You are protected on anything submitted, but do not submit anything in first letter you must have returned. Opportunity if accepted.

J. WHITFORD GORDON SALES CO.

800 N. Clark Street Chicago, Illinois

Here's the Cutter

YOU'VE BEEN WAITING FOR...

Ace-Kutter $11.95

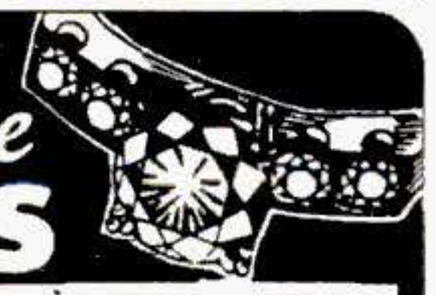
ASBESTOS SIDING AND SHINGLE CUTTER

All Steel • 3" x 3½" x 22" • Cuts, notches and punches all sizes of shingles cutting 3/16" ribbon • Complete instructions for application of Asbestos Siding furnished with each cutter • Write for FREE folder today. **TRI-STATES BUILDING MATERIALS CO., Dept. PS, 2037 E. Lancaster, Fort Worth, Texas** • Agents and dealers inquiries answered promptly.

OUT OF PAWN!

Genuine

DIAMONDS



Direct to You—Save up to 50% and more on fine quality, Genuine Diamonds, reset in beautiful modern mountings, styled for Ladies and Men—Sold with an Iron-Clad Money-Back Guarantee. Over 100,000 satisfied customers. Order now from this ad. Write us for FREE ILLUSTRATED CATALOG of other Unredeemed Diamond Pledges from $5.00 to $5000. Send today. Reference: Dun and Bradstreet or your own local bank.

1/5 CARAT $125 Value **$49** Tax incl.

1/2 CARAT $200 Value **$95** Tax incl.

BERMAN'S COLLATERAL LOAN BANK

Dept. PS-7, 636-38 W. Balto. St. Baltimore 1, Md.

ABC OF AVIATION

Now you can own this famous work on aviation that has helped thousands of readers! Big sections on private plane maintenance and repair, what to look for in your plane, etc. Tells all about construction instruments, special uses of more than 250 aircraft. 598 pages, only $1.98.

POPULAR SCIENCE

Dept. 58, 353 4th Ave. New York 10, N. Y.

35mm FILM for
LEICA, KODAK, RETINA
and other similar cameras

ANSCO Super-Pan Supreme, Ultra Speed and Fino-Pan.

KODAK Plus X, Super XX and Background X.

DUPONT Supreme #2 and Supreme #3.

ONLY $1.40 per 100 ft. ROLL

Each roll of film contains 18 strips of 36 exp.—properly notched.

Supplied on Reels in Metal Cans
Guaranteed Immediate Delivery

Send $1.40 for each 100 ft. roll and we will ship your film immediately. We pay postage.

New Plastic Cartridges, 10c ea.

Eight-Sixteen Films, Inc.
Dept. PS-6 630 Ninth Ave. N. Y. 19, N. Y.

GOVERNMENT SURPLUS BRAND NEW

VICKERS CONSTANT DISPLACEMENT PISTON TYPE 1000 P.S.I.

HYDRAULIC PUMPS AND MOTORS

Hundreds of Practical Uses

BUILD YOUR OWN HYDRAULIC PRESS, ELECTRIC EYE DOOR OPENER, FARM EQUIPMENT, MIDGET CARS, ETC.

$15.00 F.O.B. DETROIT, MICH.

BENJAMIN SALES CO.
8774 Linwood Ave. Detroit 6, Michigan

MAGNETS

OF ALL TYPES—10c UP
AMAZINGLY POWERFUL!!

4 oz. Alnico Magnet, lifts 10 lbs. $1.00. Our Leader, 15 oz. Magnet, lifts 40 lbs. $1.95. New alloy—will not weaken! Useful for lifting valuables from tanks, lakes, or rivers easily! 7 small magnets $1.00 with list of many shop and home uses. Satisfaction guaranteed.

R. L. EYRICH, 2566 N. 49TH ST., MILWAUKEE 10, WIS.

GEARS MODEL and INSTRUMENT

Spur Gears stocked in the small pitch diameters for model and instrument work. Send us your gear problems.

THE WILDER SALES CO. 26 Bedford St. Waltham 54, Mass.

NU-WAY LAWN MOWER

Build Your Own

Rotary Type Lawn Mower

We Supply Cutting Unit Complete.

Write for FREE Circular

Price **$12.50**
Why Pay More

NO INCREASE IN PRICE

TRACTOR-LITE MFG. CO., SPIRIT LAKE, IOWA

Say You Saw
It In Popular Science

Sun Glasses only $2.95
post paid
No C. O. D's

For Men

Aviation type lens; gold or rhodium plated frame. Mother of pearl sweat bar and nose pads; cable comfort temple. Four base curve ground lens.

For Women

Sensational design with up-sweep styled especially for the new look. Mother-of-pearl nose pads and paddle tip temple. Gold plated frame. Four base curve ground lens.

B & M SUPPLY Dept. G

Complete with Leatherette case
Yes! your money back if not satisfied!
1010 Park Ave., Cranston, R. I.

Government Surplus, New
DOLLY — TRAILER CONVERTER

Convert your semi-trailer into a full trailer with this new HEIL Model DC-6-2M Dolly complete with 33" fifth wheel and 4 NEW 900 x 20 Military Tread Tires.

Dolly has a Timken model T-2090-NX3 round type Trailer Axle without Brakes, and is equipped with dual 10 hole 20 inch Budd Wheels, Springs, overload Springs and Safety Chains.

Specifications:

Dolly weight unloaded.....2,000 lbs.
Overall Length.....9 feet
Loading Height .....54 in.
Overall Width .....92 in.

This Dolly can be easily converted to a pole or pipe hauling unit; or can also be disassembled and the parts used for constructing trailers of many types.

An Exceptional Buy.
$750.00 Value at only..... $400.00

PARTS FOR MILITARY TRUCKS & JEEPS

We have available for immediate delivery genuine parts for all makes and models of Army Trucks & Jeeps from 1/4 ton to 20 ton. Autocar, Brockway, Chevrolet, Diamond T, Dodge, Federal, Ford, GMC, International, Mack, Reo, Studebaker and White. We have parts catalog on some models.

To Acquaint You With Our Values We Offer These Special Items At Low Net Prices.

JEEP CARBURETOR KIT

A complete overhaul kit for the Jeep carburetor—44 different parts. Ford part #GPW 18357B, Willys #A6840, Carter #1319A. Per kit. NET..... **$3.35**

JEEP PISTON RING SETS

Available in Standard and .010, .020, .030 and .040 oversizes. Popular brands: Ramco, Perfect Circle Sealed Power, McQuay Norris, Hastings, Pedrick, Ford and Willys. Indicate Size. Per Set. Net..... **$2.25**

OIL FILTER ELEMENT

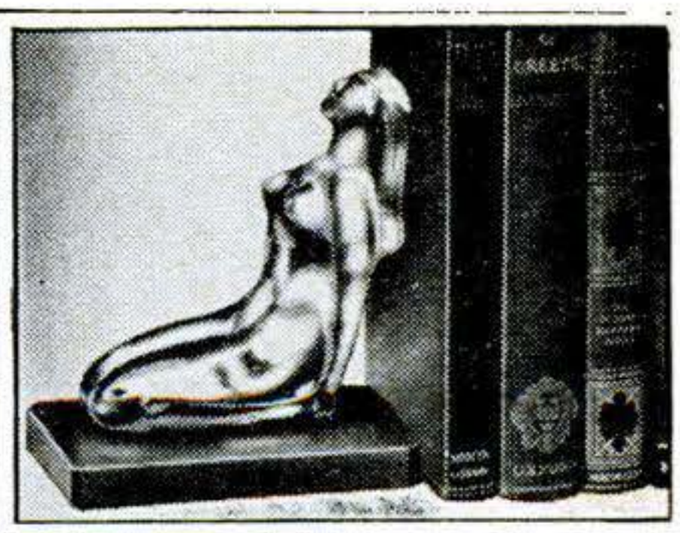
For the larger trucks, GMC, Chevrolet, Autocar, Federal, Diamond T—all trucks equipped with Military Senior Type Oil Filter. Fram #C-31. Will interchange with AC #C-25, Briggs M-Z Cell sr., Michiana SA-12800 or Purolator PD-50. Each net. **95c**

WRITE FOR OUR NEW 1948 CATALOG

FOB, K. C., Mo. 25% Deposit Required on COD Orders.

UNITED AUTO PARTS CO., INC.
1901 TROOST KANSAS CITY, MO.

Say You Saw
It In Popular Science



NEW LIQUID PLASTIC

Makes Fine Gifts, Novelties, Things to Sell

Have fun, make extra money, with **CASTOLITE** crystal clear liquid plastic. Pours without heat, sets at low temperatures. Make bookends, wall plaques, jewelry, tiles, figurines, coasters. Embed real flowers, butterflies, coins, medals. Preserve treasured photos. **CASTOLITE** can be sawed, carved, turned, drilled. Can be mixed with **CASTOLITE DYES** for brilliant color effects. It's easy to do.

You can have the thrill of making things the very first day. No tools are needed.

20-PROJECT CASTO-KIT $3.50
(W. Coast, Can., Mex., $3.75)

CASTO-KIT contains materials and instructions for making useful objects at once. Send check or M.O. for postpaid Kit today, or order C.O.D. For Manual alone, 25c. No overseas shipments. **DEALERS**—write for details.

THE CASTOLITE CO., DEPT. E-4, Box 211, Kenilworth, Ill.

Copyrighted material

Fire Tattler SAVES SLEEPER'S LIFE!

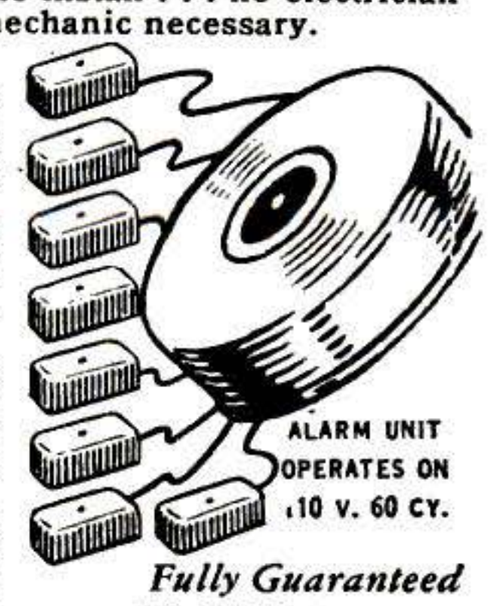
Fire Tattler's piercing automobile-type horn arouses you from the soundest sleep soon enough to reach safety . . . soon enough to save your home and family.

Last year nearly 12,000 people were killed in the U. S. by fire . . . over 2,000 of these were children under five.

Now you can protect your loved ones . . . save your property with this inexpensive fire alarm system . . . and it is simple for you to install . . . no electrician or mechanic necessary.

New **Fire Alarm**

● Hang attractive alarm like electric clock in any room, plug into nearest socket. Alarm unit (only 7" diameter) contains: relay, transformer, and compact automobile-type horn of precision build. Mount 8 fire detectors in home danger zones. Connect these in closed circuit to alarm with provided wire. Fire detectors contain replaceable units which melt before 170°F., breaking circuit and sounding alarm. Complete equipment includes: 250 ft. fine, insulated wire, screws and staples . . . nothing more to buy. For homes where there are danger areas of up to 2000 sq. ft. Circuit uses no more electricity than a large flashlight.



Fully Guaranteed
$24.75 Complete

PARCEL POST PREPAID ANYWHERE IN U.S.A.

FIRE TATTLER

Order Today! *Send check or money order . . .*

Ingersoll & Co.
502 N. Prior Ave. • St. Paul 4, Minn. • Dept. S-5

SUNGLASSES WITH CASE $2.38

Air Corps style—made to AAF specifications. Ground and polished 4 base curve lenses. Eliminate harmful rays. Gold plated metal frames. Sweat bar. Leatherette case included. Ideal for sports, driving, etc. Ladies style available same price. **Write for FREE Illustrated list Army surplus.** Orders sent postpaid except C.O.D.

Satisfaction or Money Back

CONSUMERS CLOTHING CO., INC.
Box 10-S, 26 Greene St. New York 13, N. Y.

BUILD ARC WELDER FROM OLD GENERATOR

For Light or Heavy Work. 75-200 amps. No previous experience needed. Complete **PLANS** and valuable Catalog 35c.

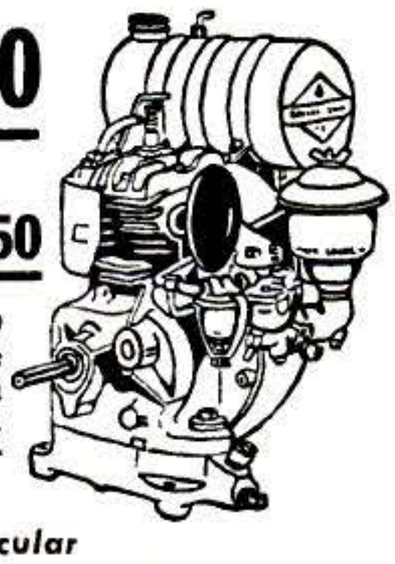
LEJAY MANUFACTURING CO.
1323 LeJay Bldg., Minneapolis 8, Minn.

BRIGGS-STRATTON ENGINES

1½ Hp Model N—Govt. Surplus

Special Low "as is" price Only..... $34.50

In good operating condition with 30 day written guarantee..... $44.50



Engines will develop almost 2 Hp at 3600 RPM. Hurry, don't wait, buy now while limited supply lasts. Suitable for lawn mowers, garden tractors, motor bicycles and scooters, midget cars, etc. Will power many kinds of machinery.

Write for Descriptive Circular

MIDWEST SURPLUS SALES CO. 2531 Indiana Kansas City, Mo.

15 H. P. Twin Cyl. "V" Engines

Famous Andover Make. Fine for Midgets, welding outfit, boats, mills, saws, etc. 32" long, 22" wide, 18" high. 4 pt. mountings (flat) 14" apart ea. way. 3600 max. RPM. 31.91 cu. in. Wt. abt. 133#. Fitted with 28.5 generators which makes fine welders, or remove for other use. 2¾" bore-2 11/16" stroke. Dual carb. Shielded ign. and fuel system. Governor (removable). Some prac. new. All usable. No junk. Parts obtainable. Our price $81.50 while they last. Two or more $75.50 ea. Guaranteed as advertised or money refunded. Run like a Rolls-Royce! You've seen our ads since 1941.

FEDERAL IDENTIFICATION CO.
1910 Classen Street Oklahoma City, Okla.

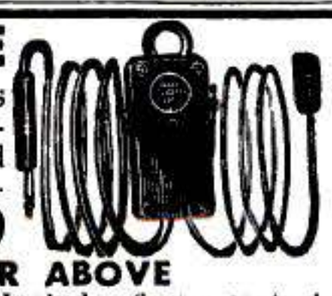
AUTO BODY & FENDER REBUILDING

Tired of Working for the Other Fellow?
Be Your Own Boss
A Big Field for Your Future

Body & Fender Rebuilding is one of the best paid branches of the automobile industry. Go into business for yourself or prepare for good job opportunities. Train at home or in our big shops. Approved for Veterans. (Non-Veterans inquire about our Low Payment Plan and Pay After Graduation Plan.) Send for FREE Booklet and full information. No obligation.

COMMERCIAL TRADES INSTITUTE, Dept. FI-5
1400 W. Greenleaf Avenue, Chicago 26, Ill.

THROAT MICROPHONE



Straps onto neck. Allows free hands and head movement. Used, but in good condition. Ideal for experimental work. Each..... **$1.00**

CORD, SWITCH AND PLUG FOR ABOVE

Rubber covered cord with plug and phone jack. Includes finger control switch with loop for hanging on neck or clothes. Each $1.25. Both microphone and cord assembly $2.00 postpaid. Order today.

AERO PARTS SUPPLY, DEPT. PS-5
MUNICIPAL AIRPORT, HOUSTON 12, TEXAS

AMAZING MYSTERY BUTTON

Startles Everybody. With this *Electronic Button* you can make your own Telephone—Amplifier—Dectectiphone. Attach this button to piece of cardboard—transmit conversation to another room. Music also transmitted to distant places. Most interesting electrical apparatus ever discovered. Enables you to perform hundreds of experiments. So tiny it can be concealed in dozens of places. A Pre-War Product. Electronic Button including 5000 word instruction booklet with 50 illustrated experiments, postpaid, only..... **$1.00**

ELECTRONIC PRODUCTS COMPANY, SAINT CHARLES 6, ILL.

RUPTURED?

New! AIR-FLO Truss

- NO RUBBER PADS
- NO METAL PADS
- NO SPRINGS
- NO BALLS
- NO LEG STRAPS
- NO BULBS
- NON SLIP
- WEIGHS 2 OZ.
- AIR COOLED
- WASHABLE

SIMPLY CLIP OVER THE HIP

IT'S ON—IT'S OFF in one second

$7.50 SINGLE — **SEND FOR CIRCULAR** — **$12.50** DOUBLE

THE ONLY TRUSS THAT REQUIRES NO PERSONAL FITTING.

Simply send us the measurement of your waistline. Specify for left side, right side or double.

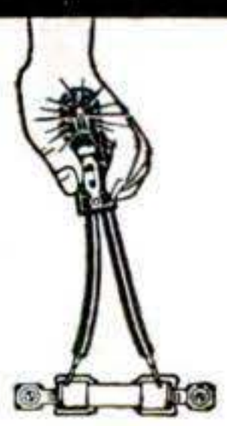
Send check or money order. Money Back Guarantee

Watkins Co., Dept. PS, 100 W. 42 St., N. Y. C.

Copyrighted material

Bring Electrical Troubles "TO LIGHT" with

BRACH TEST-O-LITE



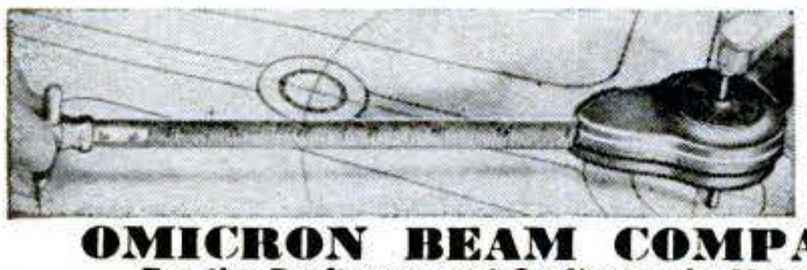
The NEON glow enables breaks, poor contacts, shorts, and defective electrical units to be located quickly in all circuits of 100 to 550 volts . . . indicates hot or grounded wires . . . tells AC from DC (and polarity).

Here's the ultra-convenient, time saving, modern tester for fuses, cut outs, radios, appliances, motors, outlets. Far superior to the ordinary, clumsy bulb. Operates one hundred per cent even on very minute current. The *only* pocket-size tester with Patented Safety Feature. Guaranteed for a lifetime.

95c at your local electrical dealer . . . or send $1.00 to cover purchase price, mailing and handling.

L. S. BRACH MFG. CORP.

200 Central Ave. Newark, N. J.



$7.50 postpaid or C.O.D. charges added. Free literature on request. Money back guarantee. Inquiries from dealers, jobbers and representatives invited.

OMICRON BEAM COMPASS SET

For the Draftsman and Craftsman in Metal and Wood

6-foot radius capacity within a few inches of space. Equipped with lead-holder and steel scriber. The steel blade on edge assures rigidity and accuracy. Instant setting of radius on graduations. Automatic lever locks blade tight. Only when lever is depressed can blade be moved. This is a precision instrument, made of the best of materials, packed in sturdy attractive wooden case. **THE OMICRON CO., Dept. 22, Box 907, Glendale, Calif.**

IMPROVE YOUR COLOR PHOTOS!

SPACO BLUE COAT $1.00 Post Paid

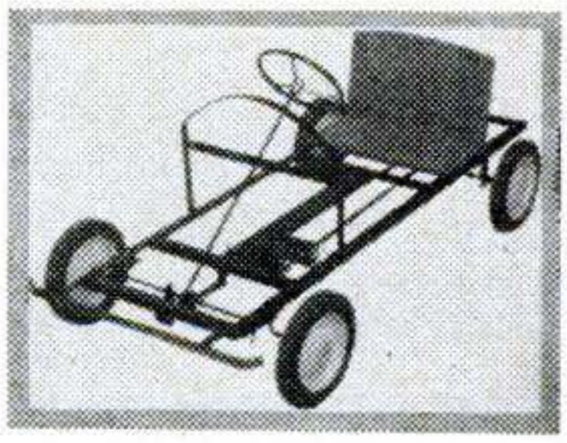
Colors any flash bulb BLUE for use with daylight type color film. Use indoors with outdoor-type film, or as fill-in light. Four-ounce bottle coats hundreds of bulbs. Just dip, rinse and dry! *A Money-saving Must! Order today!*

The Postal Photo Equipment Shop, 633 S. La Brea Ave., Los Angeles 36, Calif.

BOYS! IT'S FUN TO OWN A REAL CAR

This Big 56" Chassis has Geared Steering—Pedal Belt Drive—Adjustable Seat. Bronze & Ball Bearings. Complete Ready to ride at $29.75 F.O.B. $1.00 (no stamps) brings complete plans for a smart body easily attached. Also parts price list.

NELSON-PRICE MFG. CO.
Box 25 Rockville Centre, N. Y.



ARMY SURPLUS A-C PLANTS

Nation's greatest bargains in 110-volt, 60-cycle, 2500 and 600-watt plants. Also plants without engines. FREE CATALOG!

LECO ENGINEERING CO. Box 908-PS5, Lincoln, Nebr.

NEW! A.C. Motors Popular Make

1/8 H.P. $13.70 1/6 H.P. $14.47
1/4 H.P. $15.50 1/3 H.P. $19.25

SENSATIONALLY GOOD BUYS! These motors are ideal for power tools, essential for workshops: 110 volt., 60 cycle, 1725 RPM, ½" shaft, sleeve bearing, resilient base. Send full amount for direct delivery from factory with 1 year unconditional, money-back guarantee. Price F.O.B., N. Y. Whse.

DOMEX MAIL ORDER CO., Dept. S.—170 Broadway, N.Y.7, N.Y.

BOATS for Home Assembly

KAYAKS, ROWBOATS, DINGHIES, INBOARDS, OUTBOARDS, RUNABOUTS

Cut-To-Fit for Quick Assembly. Everything Complete plus Illustrated Instructions. No Experience Necessary. Simple as A. B. C.

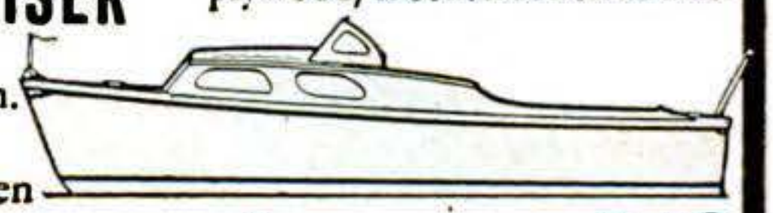
25¢ COIN FOR ALL THREE

SEND 25¢ POSTAGE (COIN) TODAY FOR 3 MONEY SAVING ILLUS. CATALOGS

Showing all '48 Models (marine plywood) & construction details.

V-23 CRUISER

Length 23 Ft.
Beam 7 Ft., 10 In.
Draft 14½ In.
Sleeps Two. Open or With Cabin.



AQUAMOBILE V-18

Designed for Auto Engines. Open or with cab. Length 18 ft. Fast VEE Bottom Hull.

Established 1928—Manufacturers U-MAK-IT KITS

KAYAK BOAT CO. 703 R-WHITTIER ST. NEW YORK 59, N. Y.

FENCING World's Finest Sport Exciting Fun—Harmless

Just Out! Two 3 ft. Spring Steel Foils with Safety Rubber Buttons. Complete Outfit 2 foils (swords) with hand guards and Free Instruction Book Now Only $1.98 Postpaid. A healthful & clean sport, makes you Strong & Alert. Instruction Book teaches Quickly-Easily. Mail check or Money Order for $1.98 Today. Add 28c for Foreign postage.

LEE PRODUCTS CO., 1613-W First Ave., New York 28, N. Y.

BE A REAL ESTATE BROKER PAYS BIG!

EASY TO LEARN—Start and run your own business *quickly*. Many graduates report making up to $1000 a month. Course of study covers *Sales, Property Management, Appraising, Loans, Mortgages* and hundreds of related subjects. Course offered in home study or residential classrooms.

FREE Big new illustrated catalog from this nationally known school. Send Post Card Today. G. I. Approved.

WEAVER SCHOOL OF REAL ESTATE
Dept. PS, 15 E. Pershing Road Kansas City, Mo.

MAKE UP TO $5.00 AN HOUR In Your Own YEAR 'ROUND Business!

ONLY A FEW DOLLARS PUTS YOU IN BUSINESS!

Many Clearing as High as $20 to $30 a Day *NET* Renewing Rugs, Carpets, Upholstery. New Method Now Used for Auto Upholstery. Write for Facts About Quick, Easy Way to Get Started

Here is the chance you've been looking for to step into a pleasant, dignified, big-pay business of your own that offers you a steady, year 'round income. Start on "a shoestring," full or spare time, right from your own home. Equal opportunities for men and women, young or old, in small towns or big cities. **No experience needed.** Many making big money with new Americlean System just cleaning auto upholstery. **Easy to learn.** We send you complete instructions and quick-cleaning supplies so you can start making money the very first day! Quick method cleans upholstery, rugs and carpets like new without taking off floor! Tremendous demand in homes, apartments, hotels, stores, office and public buildings. Steady repeat business. Territories going fast. Write today for full FREE facts. No cost or obligation. Rush letter or postcard now to

AMERICLEAN CO., Inc.
Dept. H-16, 211 North 7 St., St. Louis 1, Mo.

WRITE FOR FREE DETAILS NOW!

Copyrighted material

WAR SURPLUS • SHOCK CORD

Made in accordance with U. S. Army Specification 20-23-G (Type 1) and U. S. Navy Specification 49 C 1. Clean fresh stock. 5/8" dia. contains about 500 strands of live rubber, 3/8" about 100 strands, 1/4" about 40 strands. Sold in lengths of 25 feet or more.

Dia.	Per ft.	Per 25 ft. length
1/4"	4c	$1.00
3/8"	5c	1.25
5/8"	7c	1.75

The 1/4" length is ideal for exercise cord in flexibility. The heavier lengths have a thousand uses.

PARACHUTES

HARNESS ONLY
SEAT PACK
CHEST OR BACK PACK

Swell swing for youngsters. Complete with seat and back cushions, only. **$1.75**

Many feet of webbing, useful for tow rope, many clamps and buckles, each **$1.50**

HELMETS

Genuine African campaign sun helmets, light weight, durable, water repellent cloth, adjustable chin strap, sweat band stretches from size 6 3/8 to 7 7/8, each only..... **$1.95**

Send 25% Deposit on C.O.D. orders. Satisfaction Guaranteed or Money Refunded. Shipping charges extra. Rush your order today! FREE! Write for Illustrated Circular.

U. A. S. Corp. Dept. PS2, 5643 W. 63rd Pl. Chicago, Illinois

When Writing Advertisers Please Mention Popular Science

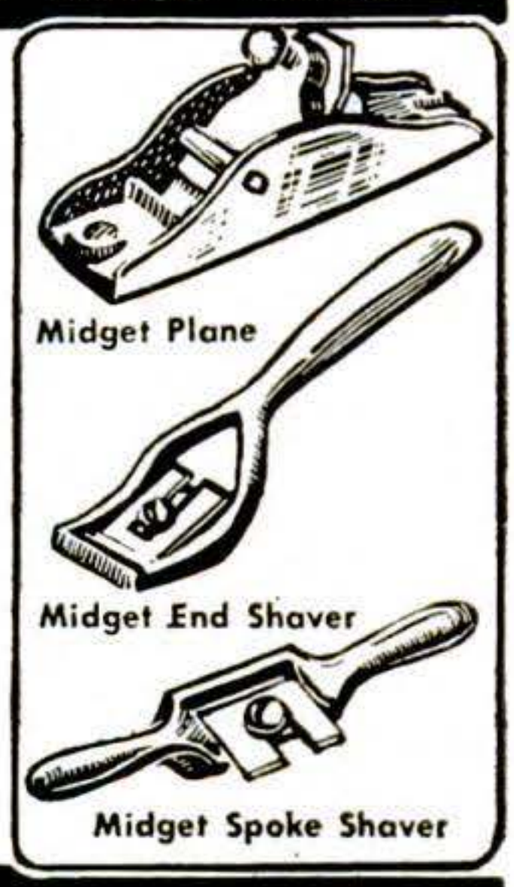
NEW! MIDGET WOOD TOOLS

Guaranteed
$3.00 Value

Now! Only
$1.98 COMPLETE

For Every Home
Hobbyists
Model Builders

WOOD-MITES—Midget tools that really work. Made of solid aluminum, with sharp, steel cutting edges. So handy!



SEND NO MONEY • ORDER NOW

TODDWARE PRODUCTS
68 E. Utica St., Buffalo 8, N. Y.
Send C.O.D. one set of 3 Wood-mites for only $1.98.

NAME_____
STREET_____
CITY_____

Shipping charges paid if cash accompanies order.

FREE! Three VALUABLE WOODWORKING PLANS

Three complete sets of plans for making attractive, useful end tables, sewing chests, scrap hampers, etc. Plans simplified so beginners can follow. FREE with purchase of full size jar of famous Rogers "Gorilla Grip" Glue for only 10c. This powerful glue makes wood furniture, toys, etc., last a lifetime.

Offer good only until June 1, 1948. Send 10c TODAY to Rogers Isinglass & Glue Co., Gloucester, Mass.

ROGERS
the best LIQUID FISH GLUE
GLOUCESTER, MASS.

CUBIC-INCHER CRYSTAL SET $2.39

SIGNAL-POWERED
NO ELECTRICITY

Transparent plastic cabinet is 7/8" square by 3/4" deep. This tiny space contains a variable tuning condenser, coil, 1N34 Radar detector, by-pass condenser, and tip jacks. Set rests easily in the bowl of a teaspoon! Works anywhere — costs nothing to operate—never wears out—the neatest bed radio you ever had! With connecting leads, complete instructions, but no phone, **$2.39** postpaid. With single phone included, **$3.19** postpaid.

CARING • DEPT. S • CHICAGO 90, ILLINOIS

"1948" MODERN MOWER

Available less Engine

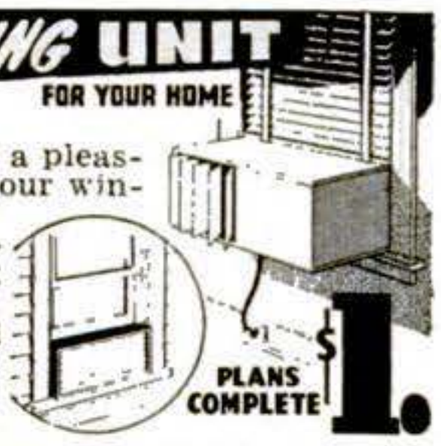
ALL PURPOSE Rotary Lawn Mower

- Mows lawns
- Cuts tall weeds
- Trims close—clean
- E-Z adjustable
- Aluminum alloy chassis
- Timken bearing spindle
- 4 Ball bearing wheels
- 20" cut. 1 1/2 h.p. engine

Write for free circular and prices

AIR-ELECTRIC MACHINE CO., INC.
LOHRVILLE, IOWA, U.S.A.

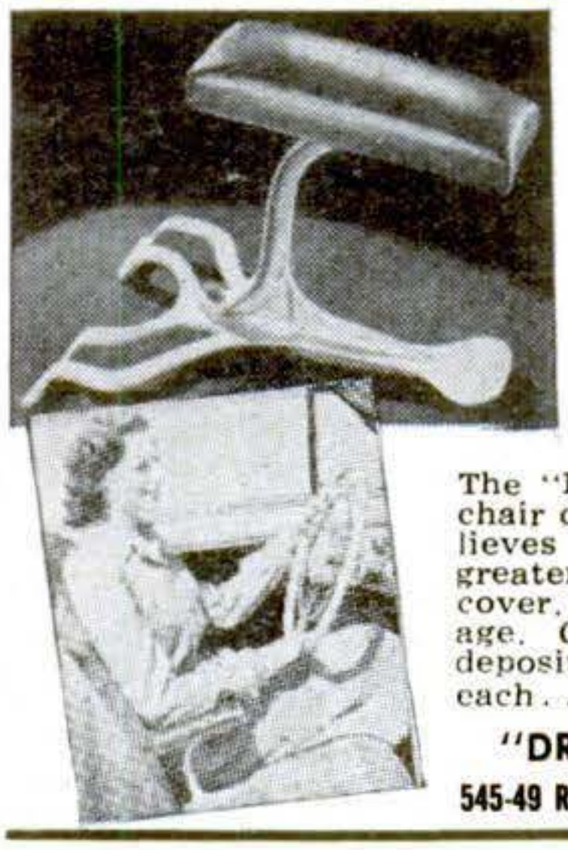
Build AIR-CONDITIONING UNIT FOR YOUR HOME



We show you how. It's easy to build and a pleasure to use. An individual unit that fits your window and really cools the room. Up to 18° cooler than outside. Real Air-Conditioning, not just a fan. Different sizes to fit any room. No expert knowledge needed. Mail $1 now for complete simplified **PLANS** and valuable Catalog.

LEJAY MANUFACTURING COMPANY
523 LeJay Building, Minneapolis 8, Minn.

PLANS COMPLETE **$1.**



NEW "DRIVE-EZ" ARM REST

- For Greater Safety and Driving Comfort.
- Fits seat of any car, truck, boat, trailer . . . home uses.

The "Drive-Ez" Arm Rest gives arm chair comfort to the motorist . . . relieves driving strain and promotes greater safety. Foam filled, with velon cover. Cash with order, we pay postage. C.O.D. send 25% deposit. Price complete, each..... **$3.50**

"DRIVE-EZ" ARM REST CO.
545-49 Roosevelt Rd. Dept. PS-5 Chicago 7, Ill.

Copyrighted material

Now Easy to Start A BIG BUSINESS in Spare Time

Metalizing BABY SHOES AND OTHER KEEPSAKES

MAIL COUPON TODAY for FREE OFFER of COMPLETE PLAN

DO YOU want extra money right away in a business you can run from your house with no house-to-house selling? Do you want to start small—the easy, inexpensive way—and watch how our guidance jumps you into bigger and bigger profits every week? Do you want a business that the whole family can help with—a business that is stable, permanent, steady—with a lifetime certainty of good income?

DON'T WASTE A MINUTE
GET THE FACTS ON METALIZING

My own shop does big business by same methods I will reveal to you. Exclusive Warner Electroplating Process—trade secrets available for first time—puts coating of actual metal (22K Gold, Genuine Silver, or Bronze) on Baby Shoes or other keepsakes. Amazing results, yet so simple and easy by my plan that you can become an Expert Metalizer in a few days.

SEND NO MONEY
Just Your Name—but Quick

Find out fast how the love every mother has for her baby's first shoes can be turned into quick cash—big profits—a permanent lifetime business for you. Complete step-by-step Business System sent to you on no risk trial—costs nothing if you return it. But get the Free facts first. Then decide. Send penny postcard or coupon today. Time is precious!

We Show You

- How to start at home in spare time
- How to Metalize the easy Warner way
- How to bring in the business
- How to start at low cost
- How to pyramid profits

WE FURNISH EVERYTHING

All supplies and mountings from one source, for quick shipment, lower your investment!

Ray Brandell, Mgr., Warner Electric Co.,
1512 Jarvis St., Dept. 25, Chicago 26, Ill.

Don't send the PLAN. First send all facts free. I'll decide after I investigate. Everything you send now is FREE. No obligation.

Name _____

Address _____

City _____ *Zone* ____ *State* _____

☆ **3¢ MAY START A FORTUNE**

WARNER ELECTRIC CO., Dept. 25,
1512 JARVIS AVE., CHICAGO 26, ILLINOIS

---

6 NEW GADGETS FOR $1.00

Preview the newest inventions of America's "gadgeteers." One dollar brings you SIX new, patented, exclusive gadgets—one a month for six months! Get them before public sale anywhere. Send $1.00 today to

GADGET OF THE MONTH CLUB, INC.
P. O. Box 2000 Los Angeles 54, Calif.

OLD GOLD JEWELRY WANTED

Dental gold teeth, plates and bridges with metal attached. Any broken pieces of gold jewelry. Immediate payment and free mailing container to you or your friends upon request.

LOWES, DEPT. PS Holland Bldg., St. Louis 1, Mo.

LEARN CARPENTRY & MASONRY

Write for Free Catalog. Make big money in the Building Trades. Learn now while opportunities are greatest. Train in our well equipped shops. Approved for Veterans.

MIDWEST SCHOOL OF BUILDING TRADES, Dept. A2-5
411 N. Center Street Bloomington, Illinois

BRAND NEW!

Delco Constant Speed Motor Type 5069625, 120 R.P.M. Has built in reduction gearing and governor. Operates on 27 volts AC or DC. Size—overall length 4½" by 1⅜" in diameter. Weight 7.5 ounces. Price $4.25 each net.

INSTRUMENT ASSOCIATES
40-37 172nd Street Flushing, L. I., N. Y.

Come and Visit Our Sound Studio

MAKE YOUR OWN RECORDS with RISCO 3-way Home Recorder

"Snapshots in Sound"

Over 10 minutes recording on a 10" record at dual speed—4½ min. at single speed.

- High quality record player
- High output for public address
- Uses professional recorder

Ready to operate with 6" spk, crystal mike. Ideal for music lessons, parties, your child's cute sayings—
COMPLETE DETAILS

$49.50
$5 EXTRA FOR DUAL SPEED PORTABLE CASE

40% OFF ON RECORDISC RECORDING BLANK
25% on COD orders—FREE CATALOG S5—ORDER FROM THIS AD

Wholesale Distributors RISCO ELECTRONICS 25 W. Broadway, N. Y. 7, N. Y.

Say You Saw It In Popular Science

MAKE FUNNY MONEY!

100% MORE PROFIT

COMIC Greeting Cards—Like You Have Never Seen Before! Rip-Roaring, happy, laugh wallops for All-Occasions. Nothing like them ever published! Hilarious Boxed Assorts. Sell on Sight! Write FREE samples, details.

NOVO PRODUCTS Dept. N-1
1757 N. Pk., Chicago, Ill.

Copyrighted material

WAR SURPLUS AND HUNDREDS OF OTHER BARGAINS

AVIATOR'S OXYGEN OUTFITS

Bail out type. Consists of all metal tank, release valve, gauge and breather hose, all enclosed in khaki colored cloth bag. These tanks are loaded with oxygen at 1800 pressure. Ideal for use as reserve oxygen supply for all types of emergency use. Shipping weight 4 pounds. All brand new.
Stock No. 391—Each... **$4.95**

MESS KITS

Regulation two-piece Army Mess Kits with folding handle. Used, but perfect. Weight 2 lbs. **No. A116**—Ea.. **69c**

CANTEENS

Reg. U. S. issue canteens. Plastic screw top chained to body. Slightly used but perfect. Wgt. 1 lb.
117—Metal
118—Plastic—Ea. **69c**

CANTEEN CUPS

All metal. Folding handle. Wgt. 1 lb. **No. A120**—Each.....**25c**

CANTEEN COVERS

Heavy canvas. Button fastener.
New **No. 530**—Each.....**69c**
Used **No. 119**—Each.....**35c**

WIRE CUTTER

Heavy duty type with compound leverage. Cuts up to 1/4 inch wire. Extended upper jaw acts as feeder to cutting edges. Insulated handles. Ideal for farm fence work and shop use. Shp. wgt. 2 lbs.
Stock No. 392—Each. **$1.95**

Heavy Duty Rubber Gloves

BRAND NEW

Extra heavy—extra long. Brand new, high quality gum rubber for softness and ease in use. Designed for heavy duty industrial service — protection in handling chemicals, acids, etc. A real bargain at this low price. **Stock No. 295**— Per Pair, Only..... **79c**

VEEDER ROOT COUNTING MACHINE

Five wheel type—counts to 99,999 and repeat. Nickel finish case. Has 1/8 inch round shank. Use it for any counting job. Brand new. Shp. wgt. 1 lb. **No. 241**, Each..... **98c**

STOP WATCH

Genuine Elgin 15 Jewel movement. Ideal for split second timing in racing, sports, time study, etc. Full sweep split second hand graduated in 1/10th seconds. Stem wind, start, stop and reset. Used but guaranteed perfect. A splendid value. Shp. wgt. 1 lb. **No. 200**—Each..... **$9.95**

POPULAR RECORD ASSORTMENT

Fifty records of modern dance, race, blues and hillbilly selections. No two alike. Famous name bands and artists included. Used in juke boxes, but guar. perfect. Shipped exp. collect only—no exchanges or refunds. Wgt. 28 lbs.
No. A303—50 records..... **$9.64**

No. A300—25 Records. All Dance. Wgt. 14 lbs..... **$4.88**

No. A301 — 25 Records. Hillbilly, Race and Blues. Wgt. 14 lbs. Set.. **$4.88**

No. 302—25 Records. All Hillbilly numbers. Wgt. 14 lbs. Set.. **$4.88**

FLEX. NECK FLASH LIGHT

Ideal trouble shooter's flashlight. Flexible neck lets you direct light around corners and inaccessible spots. Brand new! Plastic case with BX type neck. Uses 2 standard flashlight batteries. (Less batteries) Shp. wgt. 2 lbs.
No. 205 Each **$1.39**

RADIO HEAD-PHONES

Extremely sensitive with 4000 ohms resistance. Brand new and fully guaranteed. With moisture-proof cord and phone plug. A splendid value for the radio serviceman and experimenter.
A106—PAIR..... **$2.95**
New supersensitive phones.
A108—Pair **$5.95**

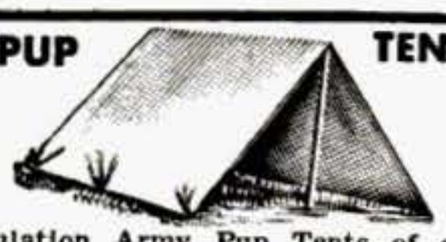
ARMY AIR CORPS TYPE SUN GLASSES

Ideal for driving, sun glare, sports and work. 24 carat gold plate frames with Pyralin sweat bar – adjustable nose bands. Large aviation type lenses. Case included. Shp. wgt. 1 lb. **No. 238**—Per Pair..... **$2.95**

7 LB. EXPERIMENTER PARTS ASSORT. KIT

A "gold mine" for the radio serviceman. Hundreds of valuable radio parts, new radar and electronic parts and subassemblies, coils, resistors, trimming condensers—worth many times this low price. **A130R**—7 lbs.... **$1.79**

PUP TENTS



Regulation Army Pup Tents of durable, brown canvas. Used, but in good condition. Fine for campers, outdoorsmen, Boy Scouts, etc. Wgt. 8 lbs. **A100**—Tent only.... **$3.95**
A110—Tent, new **$7.95**
A101—Ropes, wooden poles and stakes for above. Per set..... **$1.00**

27 LENSES, ALL NEW

For experimental work in optics. Consists of 27 precision ground and polished prisms and lens elements in assorted diameters and focal lengths. Big variety, positive, negatives, etc. Actual value over $100.00. **A519**—27 PIECES **$7.95**

ARMY TENTS 16x16 Ft.

A value you can't beat. Big 16x16 ft. pyramid tent with 4 foot drop wall. Used but in excellent condition. Poles not included. Fine for camping out, carnivals, etc. Worth twice this money. Shp. wgt. 100 lbs. **Stock No. 521**—Each only.... **$35.00**

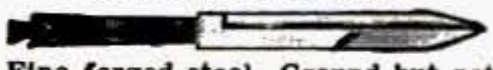
STIRRUP PUMP

Works with any pail or bucket. Shoots a high pressure stream up to 30 feet. Use it for spraying garden and trees, for whitewashing, fire fighting, drainage, etc. Complete with 10 foot flexible hose. All brand new. Regular $3.80 value. **No. 244**— Each..... **$1.49**

FISHING REEL

Exceptional quality for this low price. Has rugged one piece frame. Ratchet drag. Single action. Attractive catalin handles. Brass bearings for smooth operation. Full 100 yard line capacity. Brand new! A splendid value at this low price. **No. F412**, Each.. **98c**

BAYONET BLADE



Fine forged steel. Ground but not polished. May be made into throwing or hunting knife or spear. Blade 6¾x⅞ inches. 11¾ inches overall. Will take and hold a fine edge. Shp. wgt. 1 lb.
No. 664-R—Each..... **49c**

OXYGEN TANK

Loaded with aviator's breathing type oxygen at 1800 pounds pressure. Tank measures 13½x5½ inches with rounded ends. Tank is of solid metal fitted with brass release valve at top. Brand new! Loaded—ready for all types of emergency use. Shp. wgt. 13 pounds. A real value! **Stock No. 390**—
Each, only..... **$3.50**

Officers Watch Compass

Brand new gov't. surplus. Army-Navy model. Single jewel mounted needle. Silver colored dial. A splendid value. Shp. wgt. 1 lb.
A174—Each.... **98c**

McCLELLAN SADDLE

Brand new! Top grade cowhide, 12 inch seat. Hair girth. Has straps for blanket roll and knapsack. Gun boot and sabre loops. A real buy for any horseman. Worth much more. Shipping weight 15 lbs. **Stock No. A145.**
Each..... **$16.95**

WOOL SLEEPING BAG

G.I. type 100% wool with 30 inch Talon zipper. Used but renovated for reissue. Shp. wgt. 3 lbs. **No. 165.**
Each **$3.95**

AMMUNITION BOX

Used for 50mm ammunition. Heavy, all metal design with latching top and folding handle. Provides safe, fireproof storage for valuables, etc. Measures 12x6x7½ inches. Used but in new condition. Shp. Wgt. 8 lbs. **No. 338**—Each **79c**

RUBBER SUIT

Fits over your regular clothes and shoes. Can be cut apart for waist high waders, hip high or knee high boots, also arm length rubber gloves. Heavy gum rubber over fabric. Fine for those who work in the water, commercial fishermen, sewer diggers, etc. All brand new! Wgt. 14 lbs. **No. 183**—Each..... **$4.95**

Please add 75c for postage.

HIGH PRESSURE SHATTERPROOF TANKS

TYPE D2

A high pressure shatterproof tank of 500 cubic inch capacity—for 50 pound pressure or 6.9 cubic feet. All metal—measures 6½x24 inches. Threaded plug end vents. Shp. wgt. 6 lbs. **No. 388**— Each... **$2.45**

TYPE F1

A high pressure shatterproof tank of 1000 cubic inch capacity—for 50 pound pressure or 13.8 cubic feet. All metal—measures 9½x17 inches. Threaded plug end vents. Shp. wgt. 11½ lbs. **No. 389**— Each... **$3.75**

ORDER DIRECT FROM THIS AD

Values galore! Hundreds of hard-to-find items for home, shop and outdoors. Make remittances by money-order, bank draft or personal check. Send 25% deposit on C.O.D. orders. No C.O.D.'s on orders for less than $5.00. Include sufficient postage on parcel-post orders—any overage will be promptly refunded. All quotations F.O.B. Chicago. Used items and materials are guaranteed serviceable and as described. Your money back if not more than satisfied.

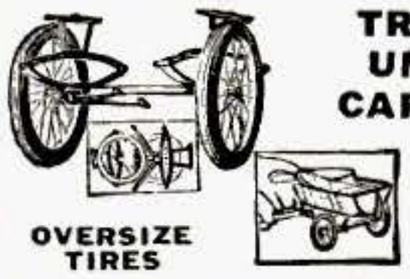
SEND 10c TO COVER POSTAGE AND MAILING ON BIG CATALOG—READY IN ABOUT 60 DAYS

WRITE FOR YOUR COPY TODAY

STARK'S

Dept. PS5
509 S. State St.
CHICAGO 5, ILL.

TRAILER UNDER-CARRIAGE



OVERSIZE TIRES

Build your own trailer for boat, camping gear or delivery service. Fitted with 26 x 2.125 U.S. Royal Tires. Motorcycle type wheels. Solid steel axle, leaf type springs and body mounting brackets. All brand new! Hitch not included. Folds to fit trunk of car. Shipped express collect only. **No. 199**, Ea. **$24.95**

Classified Ads only 70c per word per insertion, payable in advance. Minimum ad 10 words. To be included in July issue, copy should be in our office by May 28th. July issue on sale July 1st.

POPULAR SCIENCE MONTHLY—351 FOURTH AVE.—NEW YORK CITY 10

1 AUTOMOBILES

RACING Car Equipment for all cars, Engines, Racing Heads, Manifolds, Carburetors, Mufflers, etc. Speed instructions and literature $1.00—refunded first order. Lee Motorcraft Co., 1412-B Great Northern Bldg., Chicago 4, Ill.

BRITISH Sports Cars. New book. 96 makes described. Fine illustrations, specifications. $2.00. DeLuxe edition $3.00 postpaid. Clymer, Dept. B-57, 2125 W. Pico, Los Angeles, Calif.

"SPEED & Mileage" manual—Obtain greater speed, mileage, racing performance from any automobile! "Original" book gives easiest methods! Simplified speed tuning! Racing secrets! Mileage tips! Instructions on building speed equipment, economizers, mufflers, "water injectors," manifolds, superchargers, Fuels, Heads, "Hotrods," Speedsters, fast conversions, engines! Also "Hollywood Customizing" information, photographs, catalogue, parts lists! $1.98. Almquist Engineering, Milford 9, Pennsylvania.

FROM Speedway to Roadway! Track-proved Hi-speed Heads and Manifolds now available for your passenger car! No special tools needed! Increase horsepower 25%! Astounding getaway! Free illustrated catalog. Speedsport, 5747AB Waveland, Chicago 34.

KAISER-Frazer. Floyd Clymer's new book (no connection with Kaiser) gives uncensored, impartial report 3000-mile test including Pikes Peak, Kansas City—Denver record runs, economy test. Part by part equipment analysis. Good, Bad comments, no punches pulled. $1.50 postpaid. Clymer, Dept. B-51, 2125 W. Pico, Los Angeles 6, Calif.

HOT-Rod manual, fast Fords, photos, instructions, $1.50 air mailed $1.75. Racing parts list $.25. Hollywood Hot-Rod Los Feliz, Box 9626 S, Hollywood 27, California.

"PARKING AID"—Fastens to each right fender. Makes parking fast, easy, safe. Write for information. Park Aid, Box 3, Brazil, Indiana.

GREATLY Increase gas mileage! Latest copyrighted, "Economy Tuneup," tells how. No gadgets. Proven, simple facts. $1.00. Huff Industries, 10230 San Carlos, South Gate, Calif.

CLYMERTONE. Twin muffler sets, beautiful sound, complete with necessary welded pipes, E-Z installation. Ford V-8, $20.00. Chevrolet set with split manifolds, $37.50. Specify car model. Clymer, Dept. B-54, 2125 W. Pico, Los Angeles 6, Calif.

1948 SUPERIGNITIONITER Atomic Starting Pep Mileage $5.50. Eg Mfg. Co., New York 55.

"CUSTOM Styling" manual — Easily make car look Hollywoodized, custom, ultra-beautiful by quick inexpensive methods! 100 photographs, instructions on customizing, restyling, streamlining—new and old cars. Also model, sport, conversions; accessories; mufflers; engine "Soup Up" specifications! Most Complete Book $2. Almquist Engineering, Milford 9, Pennsylvania.

RACE Driver History. Complete information every driver competing Indianapolis "500" 1911 to present. 313 drivers performance records every year alphabetically arranged. $1.50 postpaid. Clymer, Dept. B-RD, 2125 W. Pico, Los Angeles 6, Calif.

DUALTONE Chrystaline packed California Mufflers. Single or twin for all automobiles. Dual Manifolds, Hi-Compression Cylinder Heads, Heavy Chromed 3" Single or Double, Tailpipe Extensions, Fender Skirts. Send 20c for catalog and deduct from first order. Dualtone Mufflers, 2636C India Street, San Diego 1, Calif.

CUSTOM-CAR Books: Complete, comprehensive (includes 50 photographs) "Master Restyling Manual." Also fascinating Photo-Packed "Custom Album." $1.00 each. Postpaid. Post Publications, Box 723-GC, Arcadia, California.

USED-CAR "Buyer's Handbook." Save money, grief! Photographs, dealers' tricks, complete tests, instructions. $1 pp. Post Publications, Box 723-TC, Arcadia, California.

NO. 4 Clymer Historical Scrapbook. Entirely new, different. 224 pages, advertisements, photographs 250 early automobiles, motorcycles. $1.50. DeLuxe edition $2.50 postpaid. Clymer, Dept. B-58, 2125 W. Pico, Los Angeles 6, Calif.

SEE our ad under Motorscooters for Midget Car bargains. Midget Motors Directory, Athens, Ohio.

HIGH Compression heads. V-8. More speed, acceleration, power. Offenhauser or Edlebrock $75.00 Complete set. Dual manifolds complete with throttle kit, full lines. Edelbrock $49.00, Offenhauser $55.00. Give make, model V-8. Catalog 10c. Clymer, Dept. B-53, 2125 W. Pico, Los Angeles 6, Calif.

"SPEED & Power" Handbook—Very latest methods! Construct your own superchargers, water injectors, compression heads, fuel saving devices—Easily, practically without cost. Get racing speed, acceleration, dynamic power increases from any automobile! Includes "Economy Information" — Ingenious formulas! Tuning techniques! Mileage! Ignition! Carburetion tricks. Fuels! Lubricants! Literature! Illustrations! Speed secrets. Including "Restyling Ideas" Stream-lining! Model revising! Customizing! Sport changes. Hotrods! Accessories! Photographs! Parts lists! $1.98 complete. Newhouse Industries, 5941-A-22 Hereford, Los Angeles 22.

1948 HOLLYWOOD Dress-Up Accessories—direct! Mileage—Power—Speed Equipment for all passenger cars! We pay the freight. Picture-Catalogue 25c. Newhouse Automotive Industries, 5941-AA, Hereford, Los Angeles 22.

BRITISH Cars. New, unique book illustrates, describes 34 British Postwar cars, all makes, models. 67 beautiful photographs. A real catalog. Just out. $2.00. DeLuxe edition $3.00 postpaid. Clymer, Dept. B-PW, 2125 W. Pico, Los Angeles 6, Calif.

MIDGET Car Book—Complete plans for easily building inexpensive midget racers, two passenger highway roadsters, 3-wheel cars, scooters, etc. Motor data, supply sources. 75 photographs, blueprints! $1.98. Almquist Engineering, Milford 9, Pennsylvania.

"VAPO-STEAMATIC" Water Injection. Thousands using this famous automatic system. Easily assembled (for less than $1.00)—no machining. Engineering triumph—burns 15% water! Saves gasolene! Reduces wear! Greatly increases horse power! Speed! Prevents sludge! Eliminates carbon! Smoother performance! Copyrighted "Installation Handbook"—with diagrams. Including "Injectors"—tractors, trucks, light planes, motorcycles. Illustrations! Lists! $1.00 complete. Newhouse Industries, 5941-A2 Hereford, Los Angeles 22.

INTERCHANGEABLE Parts Book. New book tells every automobile part that interchanges with others. Same parts many times vary 100% in price. This book enables garages, mechanics, dealers, owners to buy under cheapest listing. Tremendous savings for users. $15.50 postpaid. Clymer, Dept. B-IP, 2125 W. Pico, Los Angeles 6, Calif.

IMAGINE, 250 miles per gallon your car now. Literature 25c. Jet Engine Co., St. Augustine, Fla.

INDIANAPOLIS Model racer. Beautiful Polished Aluminum. Rubber tires. $2.50 Postpaid. S. & P. Sales, 12199 Flanders, Detroit 5, Mich.

POWER and speed equipment for all cars. Tops in heads, manifolds, cams, mufflers, etc. Save on Edmunds, Edelbrock, Offenhauser, Meyer, Weiand, or Knudson equipment. New illustrated list 25c. Chevrolet or V8 hopup instructions $1.00. Give make. Alden Motors, Oakland City, Indiana.

INSTALL V-8 engine in your Model A for extreme acceleration, more top speed, smoother performance. Complete details, photographs, $1 Postpaid, A-V-8, Box L-2, Eaglerock, Los Angeles 41, Calif.

DUESENBERG Catalog reprint. Complete data. 32 photographs various body styles, views. Complete engine specifications, includes supercharger information. $1.00 postpaid. Clymer, Dept. B-56, 2125 W. Pico, Los Angeles 6, Calif.

MAKE Your Model "A" do 100 mph. Lightning acceleration, breath-taking top speed. Complete details. Photographs. $1 Postpaid. Four Barrel, Box L-2, Eaglerock, Los Angeles 41, Calif.

MAKE your Ford fast! Complete details, photographs. How to construct 120 mph Hotrod. $1 postpaid. California Bill, Box L-2, Eaglerock, Los Angeles 41, Calif.

BUILD speedy midget track racer from castoff parts! Plans, specifications, construction information, $1.00. Motor Supply, Box CS-1682, Toledo, Ohio.

AUTOMOBILE Racing, Sixth Edition. 100 illustrations. Working drawings with building instructions for Ford-60 midget, California roadster, Offenhauser racer. Details on racer parts. Sample entrance blank. World's record 158.5 M.P.H. rear engine four-wheel drive car. Interesting information for fans, drivers, mechanics. $2.00 postpaid; $2.25 C.O.D. Ray Kuns, Department 62, Cincinnati 27, Ohio.

"POWERIZER" Water Injector—increases speed, acceleration, mileage to 30%. Easily assemble yourself for few cents! Prevents wear, knock, oil pumping! "Installation Manual" includes "Hop-up" Tips. $1. Almquist Engineering, Milford 9, Pennsylvania.

2 AUTO SUPPLIES & EQUIPMENT

AUTO parts. New or rebuilt. Prompt shipment. Write requirements. Save money, buy direct. Factory warehouse. Mechanics Auto Parts, 3807-PS North Ashland Ave., Chicago 13.

PLATING Outfits For Autoparts. Connect to a battery. No tanks used. Outfits furnished. Free particulars. Gunmetal Co., Ave. K, Decatur, Ill.

AUTO parts for all autos and trucks. Trans. motors, differentials, fenders, carburetors. Also Body Parts. Security Auto and Truck Parts, 1923-PS Grace, Chicago 13.

$7.50 VACUUM tune-up Gauge—$2.95 Manufacturer's Clearance—New Guaranteed. Instructions included. 4" Dia. Whitehead Service—Box 340—Boston 18, Mass.

REPAIR dents and holes in auto bodies with Duro Plastic Metallic Auto Body Solder. Applied with putty knife. Pints $1.50, quarts $2.50 prepaid. Leonard Sales Company, Box 6412, Cleveland, Ohio.

FREE Trial in your car: Gane Air Flow Needles for all cars: Smoother motor: Easier Starting: Faster Pick-Up: Better Idling: and from one to four miles more per gallon: State make of car and carburetor: Remit only $1.50 per needle: (8 Cyl cars use two). Advanced Automotive Products, 563-5 Lake Road, Webster, N. Y.

PISTONS: Old & New Cars. Discounts. M. Merryman, Lawndale, Calif.

STOP with confidence. Aircraft-type hydraulic pistons for most brakes. Chrysler-built automobiles a specialty. Free circular. Price Engineering, Box 1923, Wil-LaBrea Sta., Los Angeles 36, California.

MOTORISTS save gasoline by Vacumating overrich mixtures. Fits all cars. For Free particulars write Vacumatic, Dept. 1333, Wauwatosa, Wis.

READYMADE convertible tops. Easily installed. Reasonable prices. Free literature. RIO Top Co., 1370 Roanoke, Newport News 7, Va.

CAR Trouble? Million new, used parts. Describe needs. Automotive, 2928B North Western, Chicago 18.

WELDING bodies, repairing fenders pays good profits. Easy with Hobart Arc Welders, AC or DC. Catalog Free. Write Hobart Welders, Box P-582, Troy, Ohio.

SHATTERPROOF glass! Rubber mats! Shock absorbers! Direct factory savings! Write requirements. Cooper's, 3137 Lawrence, Chicago 25.

NEW life for automobile batteries. Chemical obtainable any druggist's. Cheap, safe. Instructions, tune-up tips, $1.00. Electronic Industries, Box 2733, Cleveland 11, Ohio.

VAPOR injection for Cars. Faster getaway, improved Climbing eliminates knock Carbon, installs 10 minutes. $3.98 plus postage. Rad-Ar Products, 140-27 169th St., Jamaica 5, N. Y., Dept. P.S. 2.

Copyrighted material

NEW zip. economy for your car. "Lektron" spark intensifier. State make car. $1.25 plus C.O.D. Electronic Industries. Box 2733. Cleveland 11. Ohio.

THREAD or chase heavy bolts with electric drill. Instructions $1.00 M.O. G. Stade. 332 Davida. Victoria. B.C., Canada.

3 AUTO TRAILERS

BUILD Your own trailer! Save money! Have every feature you want! Plans for house. sport. camp and utility trailers. Catalog describing 9 models 10c. 15c in Canada and overseas. Jim Dandy. Box 125-B. Wausau. Wisconsin.

HOUSE Trailer Frames. Toy-Q-Les Axles with springs. wheels. electric brakes. Bull-Dog hitches. Literature on request. Box 19. Eau Claire. Wis.

4 MOTORCYCLES, BICYCLES, SUPPLIES

WHEELS! Build wagons, scooters, mowers, trailers, wheelbarrows, grocery carts, baby carts, play pens, baby carriages. 4" to 16". Free list. Trulsen Mfg. Co., 811 E. 31. Kansas City. Mo.

WHEELS, Tires, Tubes for Motor Scooters, Midget Cars, Wheelbarrows, and Industrial equipment. All sizes. Bicycle Parts, accessories. Largest stock in United States. Send dime for list. Cycle Transport Company, 1241 S. Michigan Ave., Dept. C. Chicago 5. Illinois.

MOTORCYCLISTS. Chromium accessories. New and reconditioned motors. Complete Indian Parts. Expert motor rebuilding. Indian Motorcycle Sales. Kansas City 1. Missouri.

MIDGET Car $12. Motorbike $15. Servicycle $30. Brand New Regal Motorscooters $37.50 less motors. Midget motorcycle $35. Motoscoot $25. Salisbury $50. Wizzer Motorbike $55. Twin Harley $60. all complete. Gasoline engines $3 up. Plenty brand new 2 h.p. engines in original crates. 5500 small balloon tires $1 up. Mail order only. Send 25c for Big War-Bargain catalogue Number 25. just out. listing the above and almost 400 other bargains in new and used motors. motorscooters. midget cars. parts. plans. etc. (35c by First Class Mail). Midget Motors Directory. Athens. Ohio.

MOTOR Scooters. Bicycle engines. 120 miles gallon. Dime for catalog. Clymer. Desk B-55. 2125 W. Pico. Los Angeles 6. Calif.

STREAMLINE Motorbikes and Motorscooters. Send 20c for photos. Thomas Fisher. Antigo. Wisconsin.

MIDGET racer $40. Cushman motorscooter $15. motorbike outfit $15. Harley-Davidson motorcycle $35. Send 25c for new catalog #12 listing amazing bargains in motorscooters. motorbikes. midget cars. motors. parts. Gail. 538 Erie. Toledo. Ohio.

PROFESSIONAL Midget racer. motorscooter. midget roadster. midget motorcycle. Plans. specifications contained in illustrated handbook. 25c. Directory bargain priced used motors. motorscooters. Servicycles. etc., included free! Midwest. 3839 Drummond. Toledo. Ohio.

MIDGET automobile $15. Cushman motorscooter $20. Indian motorcycle $30. tires 75c. Send 25c for Spring catalog #940 listing sensational bargains in motorscooters. Servicycles. midget cars. used motors. parts. Associated. Box CS-1764. Toledo. Ohio.

ASSEMBLE sensational. clutch operated motorscooter speedster yourself! We furnish factory finished kits ready to bolt together. Rockbottom prices—Fork $4.95. etc.! Complete plans. literature. 25c. Zipscoot. 3839 Drummond. Toledo. Ohio.

SKEETER—Not an ordinary scooter. Youngsters love it. Four sturdy wheels—smooth. fast. safe. Made to bank like a plane. Send 10c for illustrated literature. Southern Cities Co.. 1025 Security Building. Long Beach 2. Calif.

FLAT Rate Repair Manual for Harley-Davidsons. Gives flat rate charge for every operation. Every dealer. owner. mechanic needs this new book. $2.00 postpaid. Clymer. Dept. B-FR. 2125 W. Pico. Los Angeles 6. Calif.

5 AVIATION

VETERANS: Flight training under the G.I. Bill. Private. Commercial and Flight Instructor Ratings. Write for information. Gottschalk School of Aeronautics. Adrian. Michigan.

GIANT Kites. Only $20. Fraction government cost. 10x14 ft. Double tier. This monster tows cars. skiers. skaters. canoes. Lifts light persons. antennas. advertising. cameras. Pleasure. Profit. Great-Northern Mart. North Adams. Mass.

AIRFORCE Bausch-Lomb Sextants $32.50; Fairchild Sextants $12.50; New Astro Compasses $12.50; Elgin Stop Watches $9.95; F-8 Aerial Camera $139.00. (Free Catalog) Pan American Navigation Service. 12021-D3. Ventura Bvd. N.. Hollywood. Calif.

FREE! How to fly cross-country-safely—how to land at airports—told in booklet "Happy Landings." sent to Pilots and Students. Please enclose 10c for postage and handling. Hangar Flying. Dept. (13K5). 112 E. Grove. Bloomington. Ill.

PROPELLERS—2 & 3 Blade. for snow-ice sleds. boats. Catalog. Standard Aerocraft. Box 387. Ft. Worth. Texas.

FAMOUS "Zweng" Manuals with examinations. Mechanics Manual Meteorology $3.00; Navigation $3.00; Aviation Dictionary $6.00. (Free Folder). Pan American Navigation Service. 12021-D3. N. Hollywood. Calif.

7 ELECTRICAL SUPPLIES & EQUIPMENT

NEW Double voltage generator 115 volt 1200 watt A.C.. S.P. & 28.5 volts x 200 Amps. D.C. excellent for welding generators. lighting plants & experimental work. Shp. Wt. 60 lbs. No conversion necessary. results of huge purchase. Your cost only $19.75 f.o.b. Surplus Sales. 24th St. & Cudaback Ave.. Niagara Falls. N. Y.

FLUORESCENT lights. Make your own . . . ideal for home and shop. Complete electrical parts for 20-watt fixtures with detailed instructions. Also larger sizes Postpaid only $2.00. Write Fluorokit. 332 E. Reservoir. Milwaukee. Wisconsin.

ELECTRIC Pencil: Engraves all Metals. $10. Postpaid. Beyer Mfg.. 229 C Dixon. Uniontown. Penna.

LAMPS—Build own Originals. parts wholesale any amounts. Catalogue 10c. Brown Lamp Co.. Box 501. Wellston. St. Louis 12. Mo.

WATTHOUR Meters. Reconditioned. G.E.. West.. 115 v. $2.95. T. Price. 310 14th. Raymond. Wash.

LAMP sockets. mogul sockets. three way switches. tumbler switches. receptacles. cordsets. electrical repair parts. lamp parts. etc. Catalog 10c. Gearon Company. 6405H North Oakley. Chicago.

LAMP Makers. Hobbyists: We carry largest variety lamp parts. Any part. any lamp. Harps. finials. vase caps. etc. Special attention small orders. 24-hour service. Illustrated Catalog 10c. Gyro Lamps. 5402B Clark Street. Chicago 40.

SELSYN motors. 3¼ x 5½ heavy duty 115 volts. 60 cycles. $7.50 per pair. Weber Electric. 150 Maple. Hershey. Pa.

ELECTROPLATING Simplified. all models. latest instructions and formulas. $1.00. Hawkin's. 770 Sycamore. Buffalo. N. Y.

FREE Catalog Motors. welders. welding supplies. generators. fencers. electric mowers. freezers. other electrical items. LeJay Company. Minneapolis. Minn.

8 WELDING, SOLDERING

WELDER—New portable champion special Transformer Welder; 110/220 volts. AC. 8 heat stages. Welds. brazes. solder. cuts all metals. Complete with electrode holder. helmet rods. carbons. fluxes. cables. Also special Flame Weld Torch. Easy to use. Full directions. Splendid for shop. farm and home repairs. Guaranteed. Only $27.50. Money back guarantee. Also resistor model. Now $14.95. Magic Welder Co.. 239 PS Canal St.. New York. N. Y.

SILICON steel cores 6c cubic inch. your sizes straight pieces 29 gage. Ernest Noyes. 32328 Brush. Royal Oaks. R5. Mich.

"BUILD-Ur-Own" Portable Arc Welder. Save $300. Easy with Hobart generator plus auto engine. DC Welders. or AC Welder-AC Power Plant Combination. Free Instruction Book. Write Hobart Welders. Box P-583. Troy. Ohio.

TRANSFORMER Welders. 110V. Welds ½" steel. $29. Morris Welding Service. 1850B State. Schenectady 4. N. Y.

A. C. WELDERS—Sanders—Power Mowers—Wheels accessories—Bargains. Holgerson Co.. Canton. Kans.

10 MACHINERY, TOOLS, SUPPLIES

DRILL GRINDER—Grinds drills to factory accuracy. Calipers with direct reading scales. Circle cutters. New Tool grinder. Lowest prices. Free literature. Factory. 811-A East 31st. Kansas City 3. Mo.

WAR Surplus special: Big 50 lb. box popular size bolts. nuts. washers. screws. clamps. etc. $6.85. War Surplus Co.. Box 910. New Brunswick. N. J.

FOOT Switch—Operates any 110 volt motor. power tool or device. large or small. Guaranteed. $3.95 or 2 for $6.50 Postpaid. (C.O.D.s. plus postage). Reb Industries. Dept. 265-EA. Elmhurst. Ill.

MENDAL METAL Permanently repairs cracked motor blocks. heads. scored cylinder walls. water jackets. radiators. porous welds. inside leaks. etc. Blow torch only tool needed. Positive guarantee. Special limited offer. Send $1.00 now for full Bar. prepaid. with instructions. 4A Products. Dept. 12. Littleton. Colorado.

SHEBEL Saw Filer. $7.50. Files all saws. Free trial. Circular. 730A So. 2nd St.. Milwaukee 4. Wis.

WAR Surplus in small tools for machine shop—Send 15c for bulletin. Travers Tool Co.. Dept. S. 5 Court Square. Long Island City 1. New York.

3" DISC Sander ½" Shank. Discs attached by novel screw method—$1.75. Diamond Products Co.. Box 894. Newark. N. J.

CONCRETE Block machines $39.50 up. Catalog free. Concrete Mold Company. 5466 Gravois. St. Louis. Missouri.

POWER Tools. Build your own with Lewis Castings. Save up to 80%. Complete castings. materials and blueprints supplied for 23 woodworking and metalworking tools. Free catalog. Write today. Lewis Machine Tool Co.. 3217 Union Pacific Avenue. Dept. S. Los Angeles 23. California.

SALVAGE high speed steel tools. drills. end-mills. bits. List free. Sample drills 15c. John Dickey. Newfield. N. Y.

BARGAINS in war surplus hydraulic transmissions. switches. motors. etc. Delta Sales. Dept. S-2 P. O. Box 968. Shreveport. Louisiana.

MACHINE tools released for private industry;—South Bend Quick-Change bench lathe $325.—12" Loose Change lathe $160. 6 ft. Quick Change lathe $440.—28" x 14' Heavy duty lathe $1140. Bullard 24" Boring Mill $620.—#2 Cincinnati miller $840. Small milling machine $180.—23" Upright drill. back-geared. power feed. $190. 20" drill $140. 14" Crank Shaper $540. Money back guarantee. Conversion Parts Co.. 277 Adams Street. Boston 22. Mass. U.S.A.

TAPS. dies and other tools direct by mail. Free literature. King Tap & Tool Co.. Inc.. North Attleboro. Mass.

TUNGSTEN Carbide tipped tools. high speed drills. etc. Tool Supply Co.. 3370 N. 53 St.. Milwaukee 10. Wisc.

DOLLAR Surplus Bargain! Wire cutter. stripper. screw driver. punch. steel rule. Hacksaw Blades—guaranteed—all for $1.00 postpaid. Leonard. 1300-A Douglas. Los Angeles.

LOWN sheet metal rolls. Write for bulletins. San Angelo Foundry & Machine Company. San Angelo. Texas.

METALWORKING Shop—lathe. miller. motor. drill—$98.50. Circular—10c. Machinery. Newfane 1. Vermont.

BUFFING wheels. Govt. Surplus. Stitched or loose. Specify. 3-4" & 2-6"—$2.00 postpaid. Modern Enterprises. 13750 Hart St.. Van Nuys. Calif.

DRILL GRINDER for twist drills $2.95. See ad on page 261.

SPRING steel adjustable tool chips. Keeps your tools and parts handy. Send 10c for sample. Baron Products. 20014 Rogge. Detroit 12. Mich.

13 BATTERIES, GENERATORS, ETC.

NEW Double Voltage Generators 115 Volt x 1200 Watt A.C. S.P. & 28.5 Volts x 200 Amp. D.C. Excellent for Welding Generators. Lighting Plants & Experimental work. No conversion necessary. Shipping weight 60 Lbs. Only $19.75 F.O.B. For illustrated list of surplus items send 25c. Surplus Sales. 24th & Cudaback Avenue. Niagara Falls. N. Y.

Copyrighted material

14 BOATS, OUTBOARD MOTORS, ETC.

FULL size, cut to shape boat patterns, blueprints. 7½—38 feet. Illustrated "Build a Boat" catalog, 10c (coin). "How to Build Boats" book, $1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland, Ohio.

PLYWOOD Rowboat and Motor Boat K.D. Kits. Assemble and save up to $57.50. Three popular models. Resin bonded, waterproof plywood construction. Easy to assemble in spare time. Write for free literature and complete specifications. C. R. Dillabaugh Boat Co., 7928 N. E. Mallory, Portland 11, Oregon.

LARGE Stock Reconditioned Inboard and Outboard Motors. Sizes 1 to 50 hp. Send 10c for Listings. Masters & Son, 210 West Chicago, Chicago 10, Ill.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department A, Newark 2, New Jersey.

P38 BELLY Tanks. Dropable. Free Picture. Anzio Boat Co., 89V, Merced, California.

ATTENTION Sportsmen!—Assemble Kayak from easy construction kit! Nothing additional needed! Playacks, Dedham, Mass.

BARGAIN $20. Make your own boat now with ready-made streamlined laminated one piece hull as developed for Navy. Light, sturdy, leakproof. Anyone can convert into dinghy, outboard, scooter, cartopper, other craft 9' x 4'. Write Warwood, 480 Lexington Avenue, New York 17.

TWENTY Plywood boat plans $1.00. 6 to 20 feet sail power. Catalog 10c. The Rudder, 11 Murray St., N. Y. 7, N. Y.

INBOARD Hulls. Outboard Runabouts. Hydroplanes. Hunting. Fishing boats. Trailers. Accessories. Kits. Catalog 25c. Huebl Boats, LeSueur, Minn.

OUTBOARD motors—good values, used motors. Also used parts for most makes and models. Crandall-Hicks Co., 912 Commonwealth, Boston, Mass.

MARINE Fir Plywood for boat building. Send 10c today for complete stock and price list. Trans-Marco Corporation, 70 East 45th Street, New York, N. Y.

AIRPLANE Jettison tanks—streamlined. 10½ foot, tear drop shaped. 165 gallon. Of light weight lead coated steel, weighs 75 pounds. Floats over 12,000 pounds. Ideal for making trim, inexpensive boats, canoes, kayaks, dinghys, duck boats, powered catamarans and runabouts. Prices $12.50, $9.75 each for three or more U. S. freight prepaid. General Sales, 205 Market, Grand Rapids 3, Michigan.

COMPLETE Line of Mechanical Equipment for Model Motor Boats. Write for circular. Morristown Boat Works, Bank Street, Morristown, New Jersey.

15 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase, $1.00. Motor Data, Box 7631, Kansas City 3, Mo.

GOVERNORS for Auto Engines. Ball bearing, $26.75; plain $17.25. Candee, 2641¼ S. Hill, Los Angeles 7.

RANGER Engine—Aircraft—All new in original case. 570 HP, 12 cyl. V type. Air-cooled. Engine Spec. No. 177. Complete with spark plugs. Original Government cost over $12,000.00 each. Special offer $200. Crated weight 1200 lbs. No C.O.D. Write for complete description. "Amazing Bachman's." Dept. PS, 23 Herman Street, Rochester 5, N. Y.

MAGNETO repairing made easy, send for circular. Abbott Electric Co., Quincy, Ill.

WELDING generator, 150 ampere $47.50. ½ horse 1725 RPM AC Motor $24.50. Butler, 1885 Milwaukee, Chicago.

"BUILD-Ur-Own" Combination AC Welder and AC Power Plant. Welding plus power to run tools, lights, motors. Portable. Save $350. Easy with Hobart Generator plus auto engine. Free instruction book. Write Hobartweld, Box P-584, Troy, Ohio.

MOTOR repair men, get our bulletins on stator winding tester, and A. C. motor winder. Motor Industries, Quincy, Illinois.

MOTORS! ¼ h.p., 1750 RPM, A.C., $10.75. 1/6 h.p., $9.75; 3 K.W., 32 Volt Lighting Plant, $155.00. Roberts Electric, 7232 Madison, Forest Park, Illinois.

18 BODY-BUILDING COURSES

BAR-BELLS, Dumbbells, Exercise equipment, Courses, Free booklet. Good Barbell Co., Reading, Penna.

BARBELLS, world's finest. Stamp for folders. Jackson's Barbells, Springfield, N. J.

20 BODY-Building Courses. Athletes, learn Nature's speed secrets! $1.00. Silvers Publication, 804 5th Ave., Youngstown, Ohio.

BARBELLS! 95 pound set $9.80; extra plates 9c pound. Send for free course and catalog. Bur Barbell Co., Lyndhurst, N. J.

19 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY

SINKER molds for making your own sinkers. Several styles, many sizes. Free illustrated folder. Reading Instrument Co., Box 78, Reading, Pa.

"SHOTGUNS"—"Rifles"—"Handarms"—"Ammunition"—"Rods"—"Reels"—List 10c. PS-Rudolph's, Atchison, Kansas.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 40c. Smith Museum, Runnemede, N. J.

MAKE your own Bows, Arrows. Beautiful catalog 5c; Handbook 84 pages 50c. Stemmler Archery, Manorville, N. Y.

BOWS-Arrows, write headquarters for Archery equipment. Quality products. Popular prices. Catalog 10c. Large illustrated hand book instructions, aiming and shooting, 50c. Archery, 617-A So. State, Chicago 5.

SEND $2.60 for sample casting rod that sells for $3.95. Teresi Jobbing, 1703 Olson Hiway, Minneapolis 5, Minn.

SHOTGUNS, Rifles, Revolvers. Over 500 Modern, Obsolete. Also Cartridges. List .10 coin. Ed Howe, 26 Main Street, Coopers Mills, Maine.

ANTIQUE-modern pistols, revolvers, swords, daggers, armor. 180-page illustrated catalog 50c. Robert Abels, 860½ Lexington Avenue, New York 21.

MAKE Sinkers mold $1.00. Circular Free. Langholz Machine Works, Oak Harbor, Ohio.

FISH Worms—large garden worms. $1.00—100. Wholesale 1000—$8.00. Sam Kelley, Murray, Ky.

NYLON Fishing Line, 1500 Ft., $2.25. Vinick, 1468 Montpelier, Baltimore 18, Md.

CLOSING Out:—435 antique Firearms:—35,000 coins, relics, cartridges, swords, flintlocks, carbines, minerals, antiques.—Illustrated Catalog 25c. Heike, Wenona 2, Ill.

20 FIELD GLASSES, TELESCOPES, ETC.

TELESCOPES, Binoculars, Microscopes,—big bargain catalog free. Brownscope Company, 24 West 45th Street, New York.

ASTRONOMICAL Telescopes, binoculars, microscopes; Bought, sold, repaired. Books. Lists 10c. Rasmussen-Reece, Amsterdam, N. Y.

4" ACHROMATIC lenses, perfectly figured, each $45.00. James Bray, 860 Walnut Ave., Burlingame, Calif.

POWERFUL Astronomical telescopes easily made. Perfect lenses and instructions; 100 power $3.00. 100 and 200 power $4.00. 100, 200 and 400 power $6.00. Clear vision and full power guaranteed. Instructions alone 10c. Suffolk Science Service, Manorville, N. Y.

ASTRONOMICAL Mirrors—Made to order. Herman K. Stump, Winchester, Indiana.

ASTRONOMICAL Newtonian Telescope. 6" objective, gear-drive, finder. 120 lbs. $165.00. Jerry Pavek, White Lake, Wis.

INFRA-Red filters glass 1¼" (40 mil) diameter, mounted. Snap on camera or binocular. $1.00 per set. Variable Density Filter with eyecups to fit 7 x 50 binoculars. Control light and glare to assure best conditions. Adaptable for photography. Complete $1.50. Both for $2.00 postpaid. Ross, 68 West Broadway, Section M, New York, N. Y.

REFLECTING Telescope, complete 3½" diameter, equatorially mounted. View planets, stars. $19.75. Write Skyscope Co., 475 5th Ave., New York.

GOVERNMENT Surplus-Telescopes, Binoculars, Lenses, Prisms. Send Stamp for "Bargain" List. Hobbyist Lens Set-Magnifiers, Reducing Lenses, Positives, Negatives. 10 piece set, $1.00. G. Jaegers, 123-26 Rockaway Boulevard, South Ozone Park 20, New York.

ASTRONOMICAL Telescope Lens Kit. 100x-200x-400x powers $3.00. Microscope Lens Kit, 100x-200x-400x-800x $2.00. Plans included. Pfleegor Optical Co., PS-5, Sunbury, Pa.

21 OPTICAL

4" REFLECTING telescope easily made. Semi-finished optics, polishing materials, instructions $4.95. Janan Instrument Company, Box 89, Plainfield, N. J.

22 BABY CHICKS

FARMERS, Hatcheries.—if you want to have healthy, growing Baby Chicks start using Mobley's 'Daisy Brand' Baby Chick Aid. Write Mobley, Box 3055, Hollywood, Calif.

24 DOGS, BIRDS, PETS, RABBITS

$250 MONTHLY, Raising Angora Rabbits. Particulars free. White's Rabbitry, Newark, Ohio.

PEDIGREE Airedales. Puppies. Brood Matrons, sell, Exchange for Firearms. Martin Bright, Ashland, Ohio.

RAISE "Golden Hamsters" for Laboratories, or Pets. Pem's Hamstery, 3010 10th Ave., No. St. Petersburg, Fla.

RAISE Guinea Pigs. Make money at home. Big demand. Booklet free. Taylor, Box 426B, Hapeville, Georgia.

$5,000 YEARLY possible raising Angora rabbits our Co-operative marketing plan. Iowa Angora Association, Cedar Rapids, Iowa.

RAISE rabbits. Market provided, breeding stock furnished on Production Pay Plan. Literature 25c with hutch plans $1. Hansen's Rabbit Institute, 1347 Miller Avenue, Salt Lake City 6, Utah.

RAISE Chinchilla rabbits. Year-round money-makers from furs, meat, breeders. Experience unnecessary. Write today. Willow Farm, Sellerville 16, Pa.

REPTILE Catalogue 10c, current bulletin 5c. Biological Hobby Catalogue 10c. Chameleon 25c. Quivira Specialties, Topeka, Kan.

25 FROG RAISING

NEW book explains everything! Profitable, interesting. Nufond, 1035 Marlborough, Detroit 15, Michigan.

FROGS, Crayfish, fishing canes hardwood. Lists 10c. Vol Brashears, Berryville, Arkansas.

27 MILK GOATS

RAISE Dairy Goats. All about goats and goat milk in big, illustrated monthly magazine. Sample copy 25c. Special Introductory year subscription only $1 (regular $2 a year). Booklet, "Primer for Goatkeepers", Free on request. Dairy Goat Journal, Dept. 568, Columbia, Mo.

30 FARMS, OTHER REAL ESTATE

FARMS, Ranches. All kinds, sizes. Choice of location, climate, production. Information on irrigation projects Columbia and Missouri River Basins. Resorts, summer homes. Milwaukee Railroad territory: Washington, Idaho, Montana, Dakotas, Wisconsin, Upper Michigan, Central Corn Belt. Free folders, price lists. L. H. Robbins, 613 Union Station, Chicago 6, Illinois.

OZARK Lands for All purposes. Actual river frontages, 5 acres $90.00 and upwards. Free list and literature. Hubbard, 424-M, Minnesota Ave., Kansas City 4, Kans.

GOOD FARMS—Ranches, Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Dependable crops, favorable climate. Write for literature, lists describing typical farm opportunities. Specify which state. J. W. Haw, 120 Northern Pacific Ry., St. Paul 1, Minn.

CALIFORNIA, Group, Oil Lease sharing. Lots 50' x 150'. Deeds—$60.—$5. monthly. " "Lucky Delker" " 2219 Venango—Phila., 40, Pa.

SOUTH Sea Island homesites, $10 per acre and up. Prospectus, travel instructions, general information, for $1. Charles Smith, GPO, Suva, Fiji.

CHEAP Homes; Stock, dairy, garden, fruit, poultry farms, for retiring, strong, sick folks. For hunting, fishing, long livity, health, happiness in Scenic mild Ozones. Write G. W. Starr, Ozone, Ark.

Copyrighted material

LOTS $300—convenient payments. California's finest garden section. On Morro Bay's scenic shores. Wonderful fishing, hunting, boating, bathing. Fertile soil, softest water, temperate climate, congenial community. Free literature. Richard Otto, 6560-Z, Hollywood Blvd., Hollywood 28, California.

OZARKS Farms. Give Acreage, Price desired. Glenn Hooper, Sparta, Missouri.

OZARK Magazine, Eureka Springs, Arkansas. For tourists, homeseekers. Year, $1.50.

ALASKA Homesteads, trapping, jobs, etc., Lists, Booklets, 30c. Alaska Handbook, 50c. Barwood, 2037PS 42nd, Astoria, N. Y.

STROUT'S Big Farm Catalog—Mailed Free. Describes over 2,800 outstanding Bargains, Coast to Coast. Time-Money Saver. Write Today. Strout Realty, 255-ZB 4th Avenue, New York 10, N. Y., 20 W. 9th St., Kansas City 6, Mo., 453 S. Spring, Los Angeles 13, Calif.

31 POULTRY AND SUPPLIES

RAISE turkeys the new way, write for free information explaining how to make up to $3,000.00 in your own backyard, address National Turkey Institute, Dept. 57, Columbus, Kansas.

RAISE Fryers new easy way. One man home plant earns $500 monthly. Booklet free. Poultry Guild, 1046-B So. Olive, Los Angeles 15, Calif.

32 PROFITABLE OCCUPATIONS

ANNOUNCING home study course in commercial baking. Practical basic training. Good field for those with aptitude. Nearly depression proof. Send for Free booklet, "Opportunities in the Baking Industry." National Baking School, 1315 Michigan Ave., Dept. 1723, Chicago 5, Ill.

$5000, from half acre growing Ginseng, seed supplied. Crop bought. Particulars 10c. Associated Growers, 1109 Corydon Ave., Winnipeg, Canada.

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write, Wagoner, P-125 West 86th, N. Y.

$40.00 WEEKLY. Made growing mushrooms. Fresh. Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

PROFITABLE business in making and building with interlocking blocks. Delaware Industries, Dept. 20, Muncie, Indiana.

IF you work in a factory or shop, you are passing up the opportunity of a lifetime to build a steady Extra Income by selling subscriptions to Popular Science Monthly to your fellow employees. For free kit and complete instructions write on a postcard to—Manager of Agents, Dept. A148, Popular Science Publishing Co., Inc., 353 4th Ave., New York 10, N. Y.

BECOME a real estate Broker a Profitable lifetime career in one of America's Finest Professions. Many make Fortunes. Free literature. R. N. Raymond, 1790 W. Hancock, Detroit 8, Mich.

DOLL Hospital Instruction $4.75. Big Profit. Box 124, Station C, Grand Rapids, Michigan.

RAISING Muskrats in hutches—$1.00. Cowan, Box 561, Berkeley, Calif.

YOUR own business painting flagpoles and smokestacks. Particulars free. Skyline Co., 1601-A, Uniontown, Pa.

MAKE beautiful costume jewelry at home for large profits, hobby or therapy. Free illustrated wholesale catalogue of sea shell, metal and plastic parts contains detailed instructions. Florida Supply House, Bradenton, Florida.

EXTRA money? Free Details. Trable, 1018½ Elm Street, Dallas, Texas.

EARTHWORMS. Send $1.00 for Revised Booklet on Soil Building & Better Composting. Coolville Earthworm Farm, Coolville, Ohio.

MUSHROOMS Grown. Boxes, barrels. Instruction 50c. Spawn $1.00. Gordons, 553 William, Winnipeg, Manitoba.

START lamp factory. Profitable, fascinating, easy to learn. Illustrated course teaches you. General instructions, wholesale catalog $1.00. Gearon Company, 6405H North Oakley, Chicago.

MAKE beautiful mirrors from ordinary window glass. No expensive equipment required. Details free. Tesco, Box 189-SE, Wilkes-Barre, Pa.

$150 PROFIT in 4 days made by Floyd Brown, Iowa. You, too, make Big Money in your own profitable business with amazing Liquid Imitation Marble, Fibre-Tite Flooring and Flexible Molds. Full or spare time. Experience unnecessary. Work from your own home. Write for Free Catalog, full information today! Composition Products Co., Dept. 53, 5853 Delmar, St. Louis, Mo.

CARPENTRY made easy! New self-instruction course in one large handy volume, complete with full page photographs, working diagrams, etc. Teaches practical woodworking, painting, decorating, upholstering, power tools, etc. Amazing value, only $1.98 postpaid; $2.25 C.O.D. Satisfaction guaranteed! Order "Build It Yourself." Nelson Company, 1139 Wabash, Dept. 3E01, Chicago 5.

INSTRUCTIONS how to make Rubber stamps — luminous paints — money from sawdust — resilver mirrors — raise earthworms. 25c each, all for $1.00. Davies, Box 1087-PS, Kingston, Pa.

33 BOOKS, PERIODICALS, ETC.

BOOKFINDERS! (Scarce, out-of-print, unusual books.) Quickly supplied. Send wants. Clifton Company, Box 1377 PS, Beverly Hills, Calif.

MAGAZINES (back dated)—foreign, domestic, arts, Books, booklets, subscriptions, pin-ups, etc. Catalog 10c. (refunded). Cicerone's, 863 First Ave., New York 17, New York.

USED Correspondence courses and books bought, sold, rented and exchanged. Catalog Free. Lee Mountain, Pisgah, Alabama.

BOOKFINDERS! All subjects. Send wants! Jaher Book Service, 620-K East 178 Street, New York 57.

"ADULT bookalogues," 25c. Fifteen—$1.00! Free catalogs! Hirsch, Spring Valley 3, N. Y.

BACK-DATE Magazines. Books. Specific issues—years. Arkell's, Tarzana 2, Calif.

TRADE Magazines-Business, Vocational, Diversion. Current copies 1000 publications all fields, through easy get acquainted plan. Price list Free. Commercial Engraving Publishing Co., 34S North Ritter, Indianapolis 19, Ind.

ADULT books—Unusual Fascinating—Five $1.00. Free Bookalogue. Kogan, 1032-KL Church Annex, New York 8.

BOOKS. All subjects, promptly supplied. Argus Book Service, Box 258-A, Waterbury, Conn.

"LONELY Hour Books"—Send for Free confidential listing of Books you want. Poets Corner Press, 436 Center Street, Fort Lee, N. J.

SCOTTISH Clans and Their Tartans. By Robert Bain, City Librarian, Glasgow. With 120 superb full-page color plates of tartans and history of each Scottish Clan. Imported from Scotland. Only $2.74, postpaid. Write for Free 36 page Bargain Book Catalog No. 356-PE. Union Library Association, 121 East 24th Street, New York 10, N. Y.

HOW to Retire to Ozarks. Methods by which many made go of it in this picturesque section. 35c. Haldeman-Julius, Box 5001, Girard, Kansas.

BIG Sparetime profits taking magazine subscriptions. Complete supplies, confidential catalog free. Cassell Publishers Service, Westfield, New Jersey.

1948 CATALOG, wholesale directory. 10c. Latshaw Sales, Sunnyside-C, Indianapolis 44, Ind.

"HOW To Drive an Automobile." New, Illustrated, $1. Szafarz, Box 705m, Pawtucket, R. I.

35 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS', Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo.

WORLD'S largest professional magic shop, keeps you in touch with latest tricks. To receive mailings, send 35c for new catalog. Holden's, 220-P West 42nd St., N. Y.

THE Mysterious Headless Match Trick. 25c with pamphlet of magic and joke items. Powell's, P.O. Box 2155, Potomac Station, Alexandria, Virginia.

MASTER cigarette vanisher will fool even your wife! 25c. Penny that nails to floors. 25c (wholesale). Catalog 10c. Scheetz's, Sellersville, Penna.

MAGICIANS' Headquarters — 400-Page Professional Catalogue, pocket, parlor, stage tricks. World's finest magic. Send $1.00 for Catalogue (refunded first $5.00 order). Kanter's, S-1311 Walnut, Philadelphia 7, Penna.

500 TRICKS. Send only 10c for Douglas' famous 112-page Catalog 500 Tricks. New magic for amateur, professional. America's fastest service for 25 years. Douglas Magicland, Dept. 2, Dallas, Texas.

HYPNOTIZE Speedily! Spectacular photographically illustrated book reveals sensational secrets, instantaneous stage methods, etc. "Master Course in Hypnotism"—$2. Money back guaranteed. Power Publishers, 790 Broad St., PS11, Newark 2, N. J.

LEARN magic, Ventriloquism, Mindreading. Write for particulars. Quackenbuch, Big Flats, N. Y.

LARGE illustrated catalog, circulars, listings, special offers, etc., 10c now to—Newton's, Dept. B-3, Bonham, Texas.

MAGIC will fool your friends and make you popular. Be a magician. Illustrated Catalogue 25c. Hall Magic Co. . . . C-345 John R. . . . Detroit 26, Michigan.

JUGGLE Four balls easy!!! Great fun, develops unbelievable coordination. Thin dime brings complete instructions. McHargue, 7358 Calvin, St. Louis, Mo.

HYPNOTISM! 25 Lesson Course, $1.00. Monarch, 38-S Jefferson, Auburn, New York.

15 TRICKS you can do anytime. 10c. Warpress, Conimicut, R. I.

LARGE 160 page catalog, just published, 35c. We have supplied the best tricks to beginners and professionals for 38 years. Chicago Magic Company, 2300-C No. Mason Avenue, Chicago 39.

BE a Magician. Large professional magic catalog of latest tricks, 35c. Ireland, F-109 North Dearborn, Chicago.

HYPNOTISM. Fascinating sample lesson, literature 10c. Hypnolab, 2815 W. 20th, Brooklyn 24, N. Y.

TOSS any coin either head or tails at will Anytime! Any place! Copyrighted manual $1. Arro, Bridgeport 1, Conn. (961)

HYPNOTIZE immediately! World's largest dealer offers jumbo hypnotism catalog 25c. Nelmar, 2820 No. Lawndale, Chicago.

VANISHING Quarter trick and catalog 25c. Sterling Magic Co., Royal Oak, Mich.

TRICKS, Secrets, Cards, punchboards, etc., explained. Big illustrated circular free. Mack, Box 1278-P, San Francisco.

"CAMELS" Cigarette torn in three pieces and restored! No Skill. Secret Catalog and Trick 25c. Steiner's, 316-X East 61, New York.

MYSTIFYING Pendulum Trick Stops and Starts at Performers Command 25c. University Shop, Box 921, Baltimore 3, Md.

"VENTRILLO", Professional voicethrowing instrument, and Illustrated catalog 25c. POB-971, Philadelphia.

ITCHING, Sneezing powders, eighteen other tricks. Free with Joker's catalog, 2404N15, Philadelphia.

WHOLESALE, "World's Largest Line", Catalog 25c. Manufacturers, 12 Churchlane, Philadelphia.

DOLLAR magic set free with Professional catalog 25c. Magex, 4462 Germantown, Philadelphia.

36 GAMES, ENTERTAINMENT

HOME Model Slot Machines and Coin Operated Games. Write for catalog. Webb Distributing Co., Dept. P4, 6 South Kedzie Ave., Chicago 12, Ill.

37 COIN COLLECTING

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-D50, Mass.

OLD Money Wanted. Do you know that Coin Collectors pay up to $100.00 for certain U. S. cents? And high premiums for all rare coins? We buy all kinds. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

U.S. coins lowest prices. Send stamp for lists. Hutchinson, 3463 I Street, Philadelphia 34, Penna.

30 MIXED Indian Cents $1.00. 33 Diff. Foreign Coins $1.00. International, 656 W. 171st, N. Y. 32.

Copyrighted material

KNOW the true value of old Money. Our Complete Buying-Selling Catalogue 25c. Worthycoin Corporation. 152 Washington (D-102) Boston. Mass.

COMMEMORATIVE $½ — Columbus, Washington, Cleveland, Stone Mountain, $1.50 ea. Illustrated Catalogue 25c. Norman Schultz, Salt Lake 9, Utah.

INFORMATION about U. S. coins. collectors and dealers prices. generously illustrated. 302 pages. $2.00—Hobby Helpers. Dept. H. Box 665. Washington 4. D. C.

25 DIFFERENT Indian Cents $1.00. 2 Genuine Roman coins 2000 years old.—$1.00. 10 Different $4.00. Del Monte. 725 W. 172d. N. Y. 32.

COMMEMORATIVE $½. All New—Pilgrim. Cleveland. Robinson. Long Island. Boone. Oregon. Texas. Each $1.90. General MacArthur Philippine 50 Centavos. Peso Set $2.50. Retail Catalogue 15c. Bebee Coin Company. 1180 East 63rd. Chicago 37. Illinois.

CLOSING out:—435 antique firearms;—35.000 coins. relics. cartridges. swords. flintlocks. carbines. antiques. minerals. Illustrated Catalog 25c. Heike. Wenona 31. Ill.

40 STAMP COLLECTING

DEALER'S Wholesale Catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore. Maryland.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps. 1435 E. 67th Place. Chicago 37.

ZOWIE-E-E! A Barrel of Fun for only a Dime! 500 United States Stamps—Absolutely unpicked and unsorted. just as received from church missions. Many varieties. including large commemoratives. airmails. high denominations up to $5.00! Stampdom's biggest package of fun, and you might find something really valuable!! Price only 10c to serious approval service applicants. Money back if not delighted. Illustrated bargain lists with each order. Mystic Stamp Co.. Dept. 55. Camden. New York.

UNITED STATES approvals complete coverage fine quality. attractive prices. Seminole Stamps. Box 1138-S. Coral Gables. Florida.

WOW!! $10.00 Worth Of Fun—Only 10c! What a treasure hunt! Big package 500 Foreign Stamps from foreign missions. other sources. Includes Stamps from Africa. South America, Free French, Somali, Palestine. etc. Includes airmails. commemoratives and stamps worth up to 50c. This offer sent for 10c to Approval Applicants only. Jamestown Stamp Co., Dept. 5. Jamestown. N. Y.

128-PAGE United States Catalog. 1.000 illustrations. 10c. Harris & Co.. 204 Transit Bldg.. Boston.

NICARAGUA "Tin Pan Alley" Diamond. Ecuador showing George Washington. and American Flag in natural colors. Fezzan. Trieste. "American Army" stamp First U.S. Commemorative. $100.00 Shanghai. Corsica. Anzac. Antique. others all 5c approvals. Capital Stamp Co.. Dept. 10. Little Rock. Ark.

FREE—Famous Americans set. plus Flag set. plus the National Parks set. plus the Presidential set to the $5. A total of 90 stamps absolutely free to customers for our unsurpassed United States or Foreign selection. Send 3c postage for 15 of the above mentioned stamps and full particulars. Triboro Stamp Company. 145 Nassau Street. Dept. 205. New York.

WORLD'S Largest Stamp (7½ x 14 inches). A real curiosity! Retails for 50c. only 3c to approval applicants. Tatham Stamp Co.. Springfield 50. Mass.

200 DIFFERENT. including Roosevelt triangle. 5c to approval applicants. S. Avalon Stamp Co.. Springfield. Mass.

CHOICE of 35c Worth of stamps from our first U. S. selection Free to applicants enclosing 3c postage. Large selection to choose from. Act Now!!! S. D. Engel & Co.. 38 Park Row. N. Y.

"CONFEDERATE-States" twelve different unused 10c approval applicants only. "Stamps". Box Eighty-Seven. Albany 1. N.Y.

200 DIFFERENT Stamps—cataloging up to 15c each—only 3c to approval applicants! Littleton Stamp Co., Littleton 47. N. H.

200 DIFFERENT Stamps. 6c to approval service applicants. Nationwide Stamp Company. 1323 E. 16 St.. Brooklyn 30. N. Y.

STAMP remover 25 cents. Free with approvals. L. White. Box 922. Pittsfield 2. Mass.

COLLECTORS outfit. Album. Hinges Gauge. Detector. 50 different stamps. 2 mint sets all 10c. Approvals. Carneta. 228 West 25th. N. Y. 1.

FREE. Irish commemorative collection. including Rebellion issue with approvals. Raymax. 123-X William St.. NYC 7.

FREE! Negro Triangle; Turks Islands "Cactus"; Dakar; Guinea; Palestine; "Fairy Tale." Pirate Chart. Map. Ship. Sea Lion and Snake stamps; French. British. Portuguese Colonies. etc.. Free for 3c postage. Approvals. Potomac Stampco. Washington 10. D. C.

COVER collectors! 12 different cachets of philatelic value. only $1.00. Cottingham. Wilson Center. Box 7. Norman. Okla.

FREE—$25.00 Stamp collector outfit—Finest. most complete outfit ever offered: Large Scott album. valuable collection of 1050 different stamps. Airmails. Oddshapes. Hi-values. "Stamp finder." Watermarker. magnifier. perf-gauge. tongs. and hinges. Actually over $25.00 value absolutely free when regular customer. Mail application now for Foreign approvals. Bargain Stamp Service. Dept. A. Santa Ana. Calif.

POSITIVELY Greatest Free Offer—Latest Scott's International $6.00 stamp album—covering entire world. contains 36.000 illustrated descriptive spaces; Scott's 1948 Standard $7.00 catalogues "Philately's Encyclopedia"—absolutely free to applicants for foreign approvals becoming customers. Plymouth Specialty Company. Dept. A3. Bell. California.

FREE! Complete Balkan aviation set with approvals. Beaman. Elliston 10. Va.

FREE! Tiny Chinese "Midget" War set Approvals. Seminole. Elliston 10. Va.

VICTORY Packet Free—Includes stamps from Tanganyika—British Cayman Islands—Animal—Scarce Babyhead—Coronation—Early Victorian—Airmail—Map Stamps—Including big illustrated catalogue. Send 5c for postage. Gray Stamp Company. Dept. P. R. Toronto. Canada.

31 DIFFERENT with George Washington Stamps. from Brazil and Ecuador; Pirate Island; Victory issue; Medical set; others—all 4c with approvals. Grayson Stamps. Sherman. Texas.

FINE Approvals. Fast. personal service. What countries do you prefer? I'll send their stamps. Milton Skinner. 438 Locust. Long Beach 12. Calif.

U. S. 797 SPA Sheet only 5c to applicants for U. S. approvals. M. Haycock. 333—86th St.. Brooklyn. N. Y.

319 ALL different stamps from Vatican City. Palestine. Cyprus. San Marino. etc. with our sensational new illustrated 32 page Stamp Finder. It identifies all difficult stamps immediately. All for only 10c to approval applicants. A tremedous bargain. Garcelon Stamp Company. Box 818. Calais. Maine.

107 DIFFERENT stamps from Cochin. Oceanie. Camerouns. Malta. Cyprus. etc.. only 3c to approval buyers. Dixie Stamp Company. Dept. 11. Milwaukee 1. Wis.

FREE! Triangle Roosevelt. Vatican. Ethiopia. Hitler Heads. with Approvals. Florida Stamp Company. Box 807. Miami. Florida.

$10.00 FOR $1.00. Box full excellent quality stamps valued Scott's over $10.00 and illustrated album. Everything $1.00. Super bargain. Worth much more. Satisfaction guaranteed. Longacre Shop. 100c West 42nd. New York City 18.

GERMAN! Mint. current issues. Who wants quantities? Send needs. offers. Le Baw. Milnor. North Dakota.

FREE Price List—Canada Unused singles. blocks—Bargains. A. L. Casey. Dieppe. N. B.. Canada.

BET you haven't these! South Georgia. South Orkneys. Grahamland. South Shetlands. Shortlived Falkland Dependencies. Everything 3c with approvals. Viking. 130-P Clinton St.. Brooklyn. N. Y.

5 SETS—Five countries—Triangle. Orchid. Maps. Animals. With approvals 5c. Arthur Wirth. Norwichtown 2. Conn.

BRITISH. Spanish. French Colonies. Vatican. Hitler heads. and airmail packet. free with approvals. Pan-American Stampco. Box 145. New York 33. N. Y.

15 DIFFERENT U. S. over 40 years old. 10c special to applicants for our bargain U. S. approvals. Will Portney. 1806S East 22 St.. Brooklyn 29. N. Y.

WONDERFUL value .70 different South America for 10 cents to approval applicants. Davane Stamp Company. Box 189. Reno. Nevada.

POSITIVELY Greatest free offer—Latest Scott's International $6.00 stamp album—covering entire world. contains 36.000 illustrated descriptive spaces; Scott's 1948 Standard $6.00 catalogues "Philately's Encyclopedia"—absolutely free to applicants for foreign approvals becoming customers. Approval Service. Box 1700. San Francisco. Calif.

FREE! Spanish Morocco Airmail Set. mint. with approvals. Martin. Box 1128. Miami Beach. Fla.

FREE U. S. Price List. Postage 3c. M. Hanna. 335 5th Ave.. Pittsburgh 22. Pa.

FREE Illustrated Magazine featuring stamp news and price lists. On Request. approvals for Part II Junior International Album at 50% Discount From Catalog. Gennisia Enterprises. 1566 58th St.. Brooklyn 19. N. Y.

FREE! $1.00. $2.00. $5.00 U. S.. Roosevelt. Hitler. Airmails. Approvals. Standard. Box 1616. Miami Beach 39. Florida.

FLAG Stamp Free With U.S. Approvals. E. Wenigman. 929 Oakdale. Chicago.

25 DIFFERENT Stamps 10c. Tunis And Carpenter. Wakeman Ave.. Newark 4. N. J.

OLD scarce U. S. Seconds on approval. Slightly defective. bargain prices. Hearnfeld. 551 Clinton. Newark 8. N. J.

FIRST day covers on approval. Bob Knobel. 1918 S.W. 12th Street. Miami 35. Florida.

FOR Better U. S. approvals write today—Reasonable—Box 488 A. Minneapolis.

50 DIFFERENT United States 10c Price list free. Seidenberg. Cassopolis. Mich.

GET "How To Make Money In Stamps." Free information. Write George Wentz. San Marcos 18. Texas.

WORLDWIDE Different: 200-25c; 500-60c; 1000-$1.50; 2000-$4.25. Beacon Sales. Maynard 3. Mass.

COLLECTORS in possession of extra stamps write for particulars. McPherson's Stamp Exchange Club. Branch. Mich.

SELECTED Approvals. All Countries. Want lists carefully filled. Ridgway Co.. Hampton. Bridgeton. N. J.

LIBERIAN Triangulars. 10c with approvals. Vargo Stamps. 6044 South Fairfield. Chicago 29. Illinois.

$1500.00 NEW Chinese colorful commemoratives. large complete set—Free with approvals. Gerhart. 2804 Rio-Grande. Austin. Texas.

GOOD U. S. Approvals. used or mint. Panther Stamps. Dorchester 24. Mass.

EXCHANGE your duplicates. Send 50 with 10c and receive 100 different. Bonnette. 5807 Chevy Chase Parkway. Washington 15. D. C.

ROGUES Gallery Packet. Hitler-Mussolini. 30 others. 3c. Premium. Hartland 6. Me.

BERLIN Bears. Complete set of eight and 100 different stamps only 10c to approval applicants. Reich Stamp Co.. 4647 Kenmore. Chicago 40. Ill.

FREE Monthly illustrated bulletin showing Recent Issues. Penny Approvals on request. Reed Company. Box 980. Chicago 90. Illinois.

FREE! Crystal-Mount Sample. Harrisco. 204 Transit Bldg.. Boston. Mass.

U. S. Bicentennials 12 var. complete only 10c with approvals. Hudson & Co.. Box 229. Whittier. Calif.

TRIANGLES: Five different. Monaco Roosevelt. Nicaragua. Costa Rica. only 5c with foreign approvals. Modern Stamp Service. Box 12A. Wakefield Station. New York.

Copyrighted material

$5.00 CATALOGUE Value—25c. Approvals. Lammi, Box 567, Kirkland, Washington.

INTERESTED in Nigerian stamps? Will sell 14 mint moderns for $5. Free information. No approvals. Lyle, Box 233, Jefferson, Wisconsin.

ROOSEVELT Memorial set free with approvals. Johns' Stamp Service, Box 783, Holyoke, Mass.

FIFTY Stamps from fifty countries 10c. Garrow, 84-A Monte Vista, Chula Vista, Calif.

SOUTH & Central America. 30 diff. 10c with approvals. Earl Fredenburg, 632 Birch, Marshall, Mich.

RARE British Americas Mixture: Over 20 small colonies (No Canada). 500 stamps, $2.00. Stampsales, Box 1649V, Oakland 4, California.

BELGIUM Collections: All different; 50—10c, 100—25c, 200—70c, 300—$1.50, 400—$3.60, 500—$4.75, 600—$7.50. Stampsales, Box 1649V, Oakland 4, California.

SELECTED penny approvals. Henry Jay Service, 15 Park Row, New York 7, N. Y.

WE ARE giving stamps away. Send for our CHFS. Paramount Distributors, Box 864, Denver, Colo.

TRIANGLES! Diamonds! Octagons! Midgets! Roosevelts! Hitlers! $1000.00 Stamps! Everything 5c! Thrifty Stamps, Silver Spring, Maryland.

AMAZING "Queer Countries" packet—free with approvals! Saxon, Walden, N. Y.

TRIANGLES included in packet 50 dif't. to new approval applicants for 5 cents. Harford Stamps, Box 6S, Parkville 14, Md.

BRAZIL-Truman commemorative only 10c to approval applicants. Floyd Frederick, 513½ Green Street, Lancaster, Penna.

CROATIA Set Complete, Free, Approvals. Thode, 14302t 119 Avenue, S. Ozone Park 20, N. Y.

FREE Stamps with Approvals. Surf Stamps Co., Box 2296P, Miami Beach, Fla.

PACKET British Colonial Stamps Free with first approvals. Carters, 2794 Dundas St. W., Toronto, Canada.

TERRIFIC! Globe Girdling Packet from fifty countries 10c. 200 different U. S. $1.00. Thousand mixed 35c. To Approval Applicants. AAA Stamp, Arcade Building, St. Louis, Mo.

GENUINE "Goya Nude" set complete 35c. Approvals. Royal Stamp Company, Tamaqua 2, Penna.

GIANT bicoloured royal visits, Malta pictorials, gorgeous Guianas Goose Airmail, Scandinavian packet and illustrated stamp publication 10 cents with approvals. Crown Stamps, Box 331, Toronto, Canada.

CIPEX Sheet, commemorating 100th Anniversary 1847 issue with 30 different U.S. containing early issues, commemorative, airmail, envelope, revenue. Catalog value exceeds 65c—all for 10c to approval applicants only. Curhan Stamp, Dept. P, Gloucester, Mass.

42 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 2926-Eye St., N. W., Washington 6, D. C.

50 DIFFERENT army embroidered patches $1. Other bargains. Insignia Mart, 703B Broadway, New York 3, N. Y.

UNUSED Match Book Covers. 100 all different $1.00. Free catalog. Charles Edelman, 1311 P East 84, Cleveland 3, Ohio.

SWAPPER'S, Kollektors, Hobbyist's Watcha got? Whatd'ye want? National Bulletin 25c. Royal Oak 128, Mich.

44 ANTIQUES, RELICS, INDIAN GOODS

CLOSING out:—435 antique Firearms:—35,000 coins, relics, cartridges, swords, flintlocks, carbines, antiques. Minerals. Illustrated Catalog 25c—Heike, Wenona 32, Illinois.

46 MINERALS & PRECIOUS STONES

FOSSILS Rare Assortment, over 200,000,000 years old. $1.00. G. Wershing, 221 North Solono, Albuquerque, N. M.

"GENUINE" deep red Arizona Rubies (Garnets), send quarter for packet. Mineral Specimens Company, P. O. Box 2651, Phoenix, Arizona.

MINERAL Identifications Simplified—Valuable book identifies 2,000 minerals. $3.50. Wetzel Publishing S., Los Angeles 13, California.

GEMSTONES, rough or polished. Mineral specimens. Custom Cutting. What are your needs? Plummer's, 5068 Brighton, San Diego 7, Calif.

ZIRCONS, diamond-like, sparkle, ready to set. 2 samples $1.00. 5 samples $2.00. Others. Imhusex PS, Box 232, White Plains, N. Y., Agents Wanted.

BEAUTIFUL agates, petrified woods, send one dollar for five assorted slabs, grab bag fifty cents—M & O Gem House, Mesilla Park, N. M.

GEMS, precious and semi-precious, all genuine from world wide sources. Deal direct, no overhead, save money. Catalog 10c. Hill Co., Route 7-K, Salem, Oregon.

47 CAMERAS, PHOTO SUPPLIES

PICTURES never before possible! 35mm Tri-X Film, Weston speed 200 daylight, 160 Tungsten. Guaranteed. 36 exposure cartridges, 4 for $2.50. Per dozen $7.50 postpaid. Delta Photo Supply, 690 S. Third Avenue, New York 17, New York.

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School, 1315 Michigan, Dept. 1742, Chicago 5, Ill.

ANSCO Superpan Supreme Original factory packing, frame numbered 36 exposure cartridges. Fully guaranteed. Regular price $1.10. Our special price 50c each—12 for $5.50. Delta Photo Supply, 690 S. Third Ave., New York 17, New York.

BASS says! At the sign of the old "Horse Trader," 38th year. Thousands of satisfied customers everywhere! Finest brands including Kodak, Bell & Howell, Argus, Zeiss, Leitz, etc. Satisfaction always guaranteed or your money back! Bass buys 'em, sells 'em, trades 'em. Write or wire. Bass Camera Company, Dept. AG, 179 W. Madison St., Chicago 2.

NYLON thru-vision screen, 36 x 48, in automatic lift-up box type stands. Suitable for either conventional front or rear projection with 8 or 16mm movie or slide projectors. Made for government use, available from surplus, brand new, at a mere fraction of their cost. Supplied with tripod stand. $22.50. Delta Photo Supply, 690 S. Third Ave., New York 17, New York.

200X TELEPHOTO Camera easily made. Trifling cost. Telephoto lens and instructions $3.00 postpaid. Instructions alone $.10. Suffolk Science Service, Manorville, New York.

8MM KODAK Reversible, includes Kodak Processing. 100' rolls. Suitable for 16mm cameras or Bolex H8. Short-dated but fully guaranteed. $4.95 each. $50.00 per dozen. Delta Photo Supply, 690 S. Third Avenue, New York 17, New York.

BABY Brownie camera. (Kodak-made) takes 8 pictures 1½x2¼" Special $3.16 with 1 V127 film free. Remit with order. No C.O.D. All model Kodaks available. Columbus Photo Supply, 1949 B'way, N.Y.C.

RUBBER Gloves, impermeable, acid resistant. Save your hands. Safe for all solutions. Brand new! Worth much more. Special price $1.09 per pair postpaid. Delta Photo Supply, 690 S. Third Avenue, New York 17, New York.

UTILITEE Film Adapters use small color film in large cameras. At dealers or 655 North Broadway, Los Angeles 12, Calif.

KODABROMIDE Enlarging Paper—4¼ x 825 feet rolls, enough for almost 2,000 4 x 5 enlargements. Single weight. Actual test prove its worth. Fully guaranteed. Reduces printing costs to a fraction of a cent apiece. Value over $35.00 . . . Our Price $2.25 postpaid in U.S.A. Delta Photo Supply, 690-S. Third Avenue, New York 17, New York.

INFRA-Red Film makes for unusual pictures! Eastman Kodak, 35mm Infra-Red, four 36 exposure reloaded cartridges. $2.50 postpaid. Short-dated but guaranteed. Delta Photo, 690-S Third Avenue, New York 17, N. Y.

48 PHOTO FINISHING

THREE prints each 8 exposure roll 40c. Two each 35c. One each 25c. Reprints 3c. Fred A. Eastman, Bode, Iowa.

ROLL developed, 8 prints and two enlargements 25c. Trial offer. Young Photo Service, 406-C, Albany 2, N. Y.

NEW Process developing and printing. 8 exposure rolls 35c. Mayfair Photo Service, Box 261-A, Toledo, Ohio.

PHOTOGRAPHY for pleasure or profit. Learn at home. Practical basic training. Long established school. Write for booklet. American School of Photography, 1315 Michigan, Dept. M22, Chicago 5.

SENSATIONAL Introductory Offer! Send snapshot or negative, this ad and 10c. We'll send you a beautiful 7 x 5" enlargement! Or, Kodak roll developed and printed (with free coupon) only 25c; or 8 Giant prints from roll, 30c. Reprints from negatives—any quantity—regular size, 3c; Giant size 4c. Candid rolls—36 exp. 35mm developed, vaporated, enlarged to 3 x 4, $1.00. 18 exp. 50c. Free Mailers. Free Premium offers sent on request. American Studios, Dept. 365, LaCrosse, Wisconsin.

OLD Photos Restored by master retoucher. Negative from photo $1.50. Daly, Box 91, Ansonia Station, N.Y.C.

2 BEAUTIFUL Hi-Gloss prints each good negative and enlarging coupon with each 6 or 8 exposure roll developed 28c. Owlphoto Co., Weatherford, Oklahoma.

FILM Processing to Contact or Oversize Charges on Delivered Prints Only. Mail 35c and Film to Harold's, Sioux Falls, S. D.

ENLARGEMENT from photo or negative; also copies from old photos. 5 x 7—25c. 8 x 10—50c. Mail negative or photo. Plaza Photo Studio, 116 Newark Ave., Jersey City, N. J.

50 VELOX reprints, $1. Suburban Studio, 1410-S Bond, Rockford, Ill.

LOST a precious negative? Send photograph and one dollar. Negative and proof made from your photo. Rayton Photos, 3119 A N. Kedzie Ave., Chicago 18, Illinois.

ROLLS Developed and printed 40c, six reprints 25c, stamps accepted. Flash-Photos, Box 482, Oak Park, Illinois.

ENLARGEMENTS 5x7 15c, 8x10 25c. Glossy or dull. Gorgeously oil colored 50c. Rolls developed and printed 25c. L & R, P. O. Box 1476, Milwaukee, Wisconsin.

50 PHOTOPRINTS, PHOTOCOPIES

GIANT mounted enlargements 20" x 30", $3.25; 30" x 40", $4.95; 40" x 60", $8.00. Write Warner Studio, 1625 Grand, Kansas City, Mo.

51 MOTION PICTURES, SOUND EQUIPMENT

BEAUTIFUL Kodachrome Slide and Lists 25c. Slide Supply Service, 3111 West Tuscarawas, Canton, Ohio.

8—16mm. SILENT—sound art films. International, 2120 Strauss, Brooklyn, N. Y.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue, (sample film 10c). Garden Film, 317 West 50th, New York 19.

HOLLYWOOD films. Color sample, $1.00 (refunded). Catalogs 10c (refunded). Stone, Lunenburg 10, Mass.

"BASS says! 38 years of leadership means satisfaction to you! Finest equipment, 8 and 16mm, sound cameras, sound projectors. Bass buys 'em, sells 'em, trades 'em. Satisfaction always guaranteed or your money back! Bass Camera Company, Dept. A, 179 W. Madison St., Chicago 2.

GUARANTEED fresh anti-halo outdoor movie film! Weston 12! Daylight loading! Processing free! Three spools double 8mm, $3.45! Six single 8mm for Univex, $4.60! Postpaid! Catalog. Eso-S, 47th Holly, Kansas City 2, Missouri.

SURPLUS laboratory supplies. 8mm—16mm silent; sound recording. Lists free. Fischer Photographic Laboratories, 1729 North Mobile, Chicago 39, Illinois.

DISTRIBUTORS Wanted. Make big money selling our new sensational films. Send for sample and free wholesale price list 16mm. sound, $10.00; 16mm. silent $7.50; 8mm. $2.50. Standard Pictures Corp., Universal City, Calif., Dept. B.

16MM. Sound Films. Real bargains in used cartoons, musicals, sports, novelties. Big list for stamp. Blackhawk Films, Davenport, Iowa.

CHILD is born by Caesarean delivery. Project outstanding movie production free. Send postal immediately. Movie Films, Hamilton 26, Ohio.

BARGAINS! Films. Equipment. Free catalog! Towers, 935 N. 40th, Philadelphia 4.

Copyrighted material

TWO Enlargements and negative from your Moviefilm. Send Frames and one dollar. Curiophoto, 1187 Jerome Ave., New York 52.

33MM SILENT sound films supplies. Bedner, 5300 So. Talman, Chicago.

FREE movie list. Superior Film Service, Box 713, Troy, N. Y.

LEARN movie projection, management. Free Catalog. Theatre School, Elmira, N.Y.

SEND 10c for 8mm, 16mm catalogue. Sterling's, 679 Northampton, Easton, Pa.

DEVELOP your own movie film. Literature. Duro Products, 1519 N. Eggert, Buffalo 21, N. Y.

"TONEMASTER"! Universal's powerful, new 1000W, 16mm Sound Projectors! $350, complete, prepaid! Poorman Projectors, Schuylkill Haven, Penna.

FREE Lists. Exclusive Home Movies, Projectors, Cameras. Special Discounts. Home Pix, 1674 Broadway, New York 19, N. Y.

GIANT Film offerings, 5c. American Films, 6711-S Sunset, Hollywood 28, Calif.

FILM Movetone is back. It's Weston 12 nonhalation. Free processing 100 ft. 16mm $3.25, 25 ft. double 8mm $1.50. Bulk film without processing 100 ft. 16mm $2.25, double 8mm $2.45. Free circular. Fromader Genera, Davenport 5, Iowa.

IMMEDIATE delivery of 16mm Sound projectors. Large stock of Castle, Official, Nu-Art and Pictorial films. Soundies Comedies, 16mm Ansco color film. Used 8mm, 16mm Sound. List Titlers, Splicers, Editors, Rewinders. (Home Movies, 41 South Fourth Street, Allentown, Penna.)

FREE movie catalog; Sample films, 10c. Goodwill Company, Jackson, Tennessee.

50 FT. 8MM. FILM exchange. List 3c. Filmland, 3530 Osceola, Chicago 34.

ART model films 16mm rentals exclusively, adults list. Enclose stamp. Revere Films, Box 1051, Detroit 31, Mich.

WE Buy, Sell, Rent, Exchange Home Movies. Details for dime. Midland, Box 429, Oak Park 3, Ill.

52 MUSIC, MUSICAL INSTRUMENTS

MUSIC printing $5-100.00 composing, arranging, publishing. Auto-Litho, Jensen, Florida.

TRUMPETERS—Melodious Fundamentals; Lip Flexibilities. Acclaimed greatest beginner and professional methods. $1.00 each. Sample exercises free. Charles Colin, 111-X West 48 Street, N.Y.C.

LONG Life Needle that brings new life to your records. Postpaid for $2.00. Phillips Radio, Fillmore, Calif.

HARMONICAS: Hohner $2.90, $5., $7.75; Chromatics, $15., $25., Accordions—Guitars—Trumpets—Clarinets—Bargain Instrument Catalog 25c. Musician's Shop, 2 E. Centre Street, Baltimore 2, Md.

ACCORDION students, play better, sooner, with Visuade, $1.00. Arkay, Box 5772, Cleveland 13, Ohio.

BE Independent, tune pianos, music unnecessary. Practical Piano Tuning shows you how. $2.00 Postpaid. Chord-Slide Co., Dept. PS, 3122 Lawrence Drive, Corpus Christi, Texas.

SWISS Musical units $3.50 Musical Albums, Boxes 131 West 42nd, New York 18.

PHONOGRAPH Records 20c. Catalogue. Paramount, SL-313 East Market, Wilkes-Barre, Penna.

MUSICAL movements, $3.00. Free photo. Pevar's, 4218 Viola, Philadelphia 4, Pa.

53 SONG WRITERS

POEMS Wanted to be set to music. Free examination. Send poems. McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

SONGWRITERS, Songs Published Monthly. Advance Royalty. Send your songs or poems today for our exciting offer. Hollywood Tunesmiths, Dept. 10F-C, 1537 N. Vine, Hollywood 28, Calif.

SONGWRITERS: Send Poems for Free Examination and Outstanding offer. United Music, 116, Salem, Indiana.

$1,200.00 PAID Yearly to new songwriters. Opportunity for publication and advance royalty. No charge for melodies. Records, lead sheets furnished. Send song material now for free examination. Get details. Cinema Song Company, Dept. B-57 Beverly Hills, California.

RADIO wants poems for musical setting. Radio Composers, WDH, Clinton, N. C.

POEMS wanted for musical setting. Send Poem for immediate consideration. Hamann Service, 626 Manhattan Bldg., Milwaukee, Wisc.

TREATISE on song writing—25c. Urab-P5, 245 W. 34th St., New York 1.

HONEST outstanding music writing offer. Len-Tex Studios, Leonard 3, Texas.

SONGWRITERS—Protect your songs. Get the facts first. Free booklet, attractive offer. Song Service, 331-J West 46th, N. Y.

PROTECTION, benefits, etc., Memberships open. National Songwriters Association, Box 21, Essex Station, Boston 12, Mass.

POEMS Wanted For Musical Setting. Send poem for free examination. Five Star Music Masters, 646 Beacon Bldg., Boston.

54 RADIOS, SUPPLIES & EQUIPMENT

MAKE Simple, Tubeless, Batteryless, Distance-Getting Crystal Radios. Crystal and illustrated instructions 25c postpaid. Allen, 427-S, Clinton, Mo.

U.S. Signal Corps Featherweight Earphones $1.00. Radio Service men and experimenters send stamp for our giant radio catalogue. Save dollars. United Radio Co., (100-V) Newark 1, N. J.

BUILD "Loudest" Crystal Radio. Instructions. Loud Crystal Catalog: 25c. Amoroses, Route Four, Richmond, Virginia.

BARGAINS—Complete Crystal Radio Kit with Headphone, Aerial, Illustrated Instructions, only $2.95. Free List. Radios, Phonographs, Supplies. Al's Radio Service, Sioux City 7, Iowa.

FIX any radio. Amazing new instrument locates radio troubles double quick. Simple instructions show you how. Thousands in use. Write today for 24 page booklet "The Inside Story." Feiler Engineering Co., 945 George St., Dept. PS, Chicago 5, Illinois.

MAKE Selective distance getting Crystal radios. One tube radios. New designs. Instructions, crystal, 25c. Radio Leader, La-Verne 6, Calif.

HALLICRAFTERS, National, other radios wholesale. Terms. Write. Henry Radio, Butler, Missouri.

24 PAGE Plans "18 Crystal Sets" (SW record 5800 miles). Catalog. "Radiobuilder"—all 25c. Laboratories, Eye-t, San Carlos, California.

26 YEARS Experience radio repairing at your fingertips. I've repaired 45,000 radios. Have perfected simple system you can follow step by step. No calculations or formulas. Total price $2.00 postpaid or COD. Moneyback guarantee. Ross Radio, 14615-N Grandriver, Detroit 27, Michigan.

PLAY records the wireless way. $13.95. Details free. Myles, 3433 Maple, Berwyn, Illinois.

56 BUSINESS OPPORTUNITIES

$25 WEEKLY working two hours daily. No canvassing. No Manufacturing. Lycke, Box 2471, Cleveland 12, Ohio.

OPERATE profitable home business selling merchandise by mail. Fast sellers. Large profits. Powell Service, 5713 Euclid, Cleveland 3, Ohio.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

SPECIALTY Manufacturing, the big money business that can be operated anywhere, start on a very small capital; we supply dependable formulas and complete instructions; get interesting Free booklet, "Money-making Opportunities in Specialty Manufacturing." Howard Robinson, Ph. G., 1300-B S. Ohio St., Sedalia, Mo.

137 PLANS to make money local, mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E, Decatur, Illinois.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, Minnesota.

START home business making statuettes, plaques, artificial marble flooring, liquid marble, flexible molds, metallizing baby shoes. Amazing profits. Folder Free. Creative, 236-M, Winnetka, Illinois.

TRAVEL anywhere anytime. Earn $85.00 week up. Be your own boss. No experience necessary. Less than $5.00 investment required. Literature free. Traveler, La Grange 2, Indiana.

BIG profits and your own business casting new 1948 Metal Toys and Novelties. Latest scale model Autos, Original Ashtrays, Savings Banks, Water Pistols, etc. Enormous wholesale and chain store demand keeps manufacturers busy. No experience or special place necessary. Write for details and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N.Y.

YOUR own plastic business at home. Produce costume jewelry, novelties, statuettes, liquid plastic, liquid marble, flexible molds. Write for free book. American Trades, Box 89-B-6, Cincinnati 39, Ohio.

MEN and women wanted to place self-selling coin machines in stores, hotels, filling stations, etc. New machine earns up to $6.00 weekly—costs only $10.50. We furnish supplies and machines for nuts, gum, candy, stamps, scales and amusements. Free details of tested selling plan. Write Dept. Z, Parkway Machine Corp., 623 W. North Ave., Baltimore 17, Md.

START Mailorder Bookshop—Everything furnished. 25c brings booklet, samples, exciting ideas. General Publications, Ossining 1, N.Y.

START Your own electroplating business, highly paid, uncrowded field. Learn at home in spare time. Send postcard for free electroplating booklet and proof. Plater-Hyde, Room 523, 432 "F" Street, San Diego 1, California.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

FOR an extremely profitable lifetime business operate a Collection Agency-Credit Bureau. Easily learned. Free folder. Cole & Associates, Syracuse 2, N. Y.

A FACTORY in your home garage! Mfg. and sales rights, mechanics' waterless hand cleaner. $500—$800 monthly. No special equipment necessary. Western Aircraft Mfg., Dept. G, Los Angeles 6, Calif.

A BUSINESS start on small capital! Write for full information on Manufacturing formulas-analysis-consulting services. Fairview Laboratory (Dept. A), Box 455, Tooele, Utah.

BE Your own boss. Have the security of a steady income with minimum capital investment, operating lowest cost penny person weighing scales. 100 scales can easily be operated as a spare time occupation with an average monthly income of well over $400. No experience necessary. Write Hamilton Scale Company, 216 Oliver Street, Toledo, Ohio.

NO selling, operate vendors, amazing profits, details Free. Factory Silver-King Corp., 622 Diversey, Chicago, Ill.

RUBBER Molds. Illustrated list Free. Oman, 642-S Broadway, St. Paul 1, Minn.

AT Home — Your own manufacturing business; making popular $1.00 novelties. Cost you 3c to 15c. Everything supplied. Write So-Lo Works, Dept. D-601, Loveland, Ohio.

EXTRA Money in your pockets. Steady profit. Make-sell specialty products. Tested products and sales plans. Complete treatise $1.00, particulars free. Karamus Products, Dept. 10, Linden, N. J.

COLORADO and Wyoming's fabulous oil boom spawning new millionaires. You too want shot at $1,000—$5,000—$20,000 on investment of only $140? New high price of $2.65 per barrel for oil setting people crazy. Write me today—not tomorrow for details. I'll attend to everything while you stay home. Dyer-PS, 1835 Champa Street, Denver, Colorado.

POPCORN Machines. Potato Chip outfits. Long Eakins Co., 4863 Hi St., Springfield, Ohio.

MACHINES available for making new designs of interlocking concrete building blocks. Delaware Industries, Dept. 21, Muncie, Indiana.

LEATHER Craft supplies. Leather, Tools, Dyes, Kits. Catalog 10c. Lea & Avery, Hampstead, N. C.

Copyrighted material

LEARN Piano Tuning. Repairing. at home. Tremendous field! Piano parts. tools furnished. Established 1935. Empire School of Piano Tuning. 606-A East University Ave.. Champaign. Ill.

IF you work in a factory or shop. you are passing up the opportunity of a lifetime to build a steady Extra Income by selling subscriptions to Popular Science Monthly to your fellow employees. For free kit and complete instructions write on a postcard to—Manager of Agents. Dept. A148. Popular Science Publishing Co.. Inc.. 353 4th Ave.. New York 10. N. Y.

UP to $1500. yearly selling by mail in spare time interest you? New ideas and plans every month. Details free. BIOM Club. Box 588-S. Stillwater. Okla.

DEALERSHIP available for patented Auto Towbar. Unusual opportunity. Samples $2.73. Barnorarl Industry. 19338 Griggs. Detroit. Michigan.

MAKE flexible molds! Few cents each! Cast plaques. novelties. bookends! Free sample! H. Tooker. Hamilton 7. Ohio.

OWN Mirror shop. Resilver mirrors. Glass sign making. Electroplating. John Sprinkle. V90. Marion. Indiana.

YOU make them. we sell them! New liquid plastic makes many items! Terrific Demand! Earn minimum of $50.00 per week at home. No experience or machinery required. We supply raw materials and instruction. Write Travaco Laboratories. P. O. Box 1883. Boston 5. Mass.

"GOLDEN Opportunity." How to Establish and Operate a Successful Mail Order Business. Free information. Palmer Publications. 4219-D Southwest Marigold. Portland 1. Oregon.

MAKE perfume. Complete outfit $7.50. Information free. Lawson. 21 Joiner. St. Augustine. Florida.

MAKE money at home in spare time like I do. Write today for details. Business Associates. P. O. Box 263. Port Huron. Mich.

EARN faster promotions on your job. Exciting new book shows how. Details free. Castle Book Company. 36 Glenwood Road. Baltimore 21. Maryland.

BABY Shoes preserved. Formulas. Instructions $1.00. Supplies & Bases. Novelty Bronzing. Box 56. Hyde Park 35. Mass.

NEED Extra Money; Show Write-N-Raise Embossing Sets. Earn plenty. Royal. Box N-92. Station "B." New York 2.

MEN with ambition apply only. Make money in Mail Order. Small Capital. Not a Get rich quick plan. Inquire. Bacon Enterprises. D 27. Ware. Mass.

ADVICE for Sale—on business problems —by man of over 45 years' experience. Circular free. David Ornsteen. Box 985. Los Angeles 53.

MAKE money making new greaseless doughnuts at home on electric machine. Wholesale to grocers. drug stores. cafes. hamburger shops. Send for free recipes and plans. S. Ray Company. 3605 South 15 Ave.. Minneapolis 7. Minnesota.

BUY nationally advertised merchandise for others; radios. refrigerators. washers. sweepers. appliances. etc. Low wholesale prices. Make commission each purchase. Up to 5.000 year possible. Easy. fascinating new business. Free information. Cox. 14 Church. Sagus 8. Massachusetts.

MAKE profits in mail order business. Astounding plans describing method sent free. Jimton Service. Lock Box 1373M. Mobile 8. Ala.

MAKE and sell candy professionally. inexpensive to start. information free. Philip Pate. Kissimmee. Florida.

RAISE Ginseng. Roots Bring Fortunes. Circular Free. Fezler Seed Co.. Patchogue. N. Y.

AGENT or exclusive distributor for cigarette lighter Mfg. MacGregor. Tahoe Valley 15. Calif.

MANUFACTURE costume jewelry at home for profit. hobby. therapy. Free wholesale supply catalogue. Instructions. Florida Supply House. Bradenton. Florida.

LIQUID Rubber for making flexible molds. Cast novelties. Sample bottle 25c. free literature. Chaney. 1130 E. 16th St.. Jacksonville 6. Fla.

WANTED! Distributors—All makes Nationally Advertised Rebuilt Vacuum cleaners. Guaranteed Like New! Catalog Available. Bilmar Bros.. 711 West Lake Street. Dept. 18. Chicago 6. Ill.

BE Your own boss. Metallize baby shoes. At home spare time. Schwieger. 8404-A West Chestnut. Wauwatosa 13. Wis.

QUICK Money! "Repairing Car Batteries." At home! Easy too! Write. Batteryman. Grand Junction 1. Colorado.

START Business! "With $1.00"! Moneymaker! Free Sample! Stephen's. Grand Junction. Colorado.

ENJOY yourself make friends with Magic 40 tricks $1.00. Magic Package 25c. Lindhorst. 612 E. Pine. St. Louis. Mo.

START a home busines in spare time. Make extra money. Literature free. McPherson. 510 SW 7th Court. Miami 36. Fla.

EXTRA Money? Free Details. Trable. 1018½ B Elm Street. Dallas. Texas.

PLASTER Paris gets hard as stone. Just mix in "Roc." amazing new chemical—Air bubbles come to surface. disappear. Finished casts hard. ring like a bell. Enough for 2.000 casts only $1.00 Postpaid Money back guarantee. So-Lo Works. Dept. D-203. Loveland. Ohio.

GET $1.25 guaranteed Fire extinguishers. Scheall. Box 225-S. Duluth. Minnesota.

REPAIR Alarm Clocks. Instructions 50c. Clifford Jones. 1201S. Dudley. Utica. N. Y.

METALLIZE baby shoes. Excellent profits. New system assures success. Free details. Treasures Forever. 89 Henry Ave.. Lynn. Mass.

DON'T Guess or Wonder Any Longer about what to sell by mail. Sell names. A concise and practical business course. with sound and proved methods. plans. successful ideas. $1.00 postpaid. Milton T. Clements. Avon Park. Florida.

AUTOMATIC Rhinestone Machine Attaches Rhinestones to dresses. scarfs. blouses. etc. Makes it possible for women to transform low cost items into glamorous accessories. Rhinestone setter comes complete with quantity of Rhinestones. Unbelievable fast seller at $1.95. We are appointing distributors now. Write for details. Kapner Distributing Co.. Dept. 56. 2248 Second Ave.. New York 29. N. Y.

$126.50 GUARANTEED weekly. Send $1.00 deposit. Stannette. 277 Madison Street. New York 2.

WHITE Liquid Rubber for making flexible molds! Quick drying! Safe! For home. classroom. or industry! Quart $2.00. Gallon $5.95. Full instructions! Beginners booklet on molding and plaster casting 25c. Free with order! Plastercraft Supply Company. 1406 East 43rd Street. Cleveland 3. Ohio.

SPECIAL Rubber for making molds. Literature and sample free. Universal. Box 1076-B. Peoria. Ill.

MAKE Rubber stamps. metalize baby shoes. silver mirrors. Make plaster novelties. Catalogue of "20 ideas" Free. Universal. Box 1076-B. Peoria. Ill.

HOW and Where to obtain capital. Particulars free. Star Service. Wapakoneta. O.

RAISE Earthworms. Instructions $1.00. W. Huffman. 391 Pleasant Lake. Rives Junction. Mich.

RUBACREAM! Natural Rubber Latex! Makes molds quicker! Thicker! Free Sample convinces! Castcraft Studios. 509-S Fifth Avenue. New York 17.

INCOME from local information. No Selling. Details 25c. Neher Co.. LaVerne. Calif.

SELL Greeting Cards. Pictures. Signs. Novelties. Books! Large Profits! Catalog Free! Elfco. 434 North Wells Street. Chicago 10.

I STARTED myself a very profitable business. You can too. Details $1. Particulars Free. Baikel's. 1636 West Eleventh. Muncie. Indiana.

"FOR-Rent" Fifty 5c Nut Vending Machines. only 4c per day. That's ten modern machines for less than a cent. Rankin. Box 767. Milwaukee 1. Wisconsin.

BUYERS Wanted for plaster novelties and religious statuary. Painted—unpainted. retail—wholesale. Write today for free information. Bing Products. 88-B5A Broad. Boston 10. Mass.

BE A used car dealer. Tested plan $1.00 or details. Smith. 17E Rockland Ave.. Yonkers. New York.

WOULD you pay 3%—first $350 made? Color-illustrated book "505 Odd. Successful Enterprises" free! Some offer occasional "day off." Work home. Expect something odd! Pacific. Oceanside. Calif.

ELECTROPLATING Power units. deliver 2. 4. 6 & 8 volts D.C. from 115 V. A.C. 4 Amp. unit $19.95. 8 Amp. unit $29.95 with plating instructions. Instructions only $1.50. Kissel Electric Products. 431 Sherman. Galion. Ohio.

HANDYMEN—Earn money home operating Community "Fix-it" Shop. Write Stafford. 708 Rawlings. Carbondale. Ill.

GET Hundreds Money Making Deals. business ideas. plans and manufacturing. Amazing folio free. Austin Mail Service. 5538 Lexington. Chicago. Ill.

MAIL Order Businesses. bought. sold. brokered. Write for Free bulletin of exclusive opportunities. Turnipseed. Inc.. Box 681. St. Louis. Mo.

GOODYEAR—Has natural Malaya 75% heavy brushing rubber for molds. Trial half pint 50c. Write for full particulars. Goodyear. Main St.. Lake Geneva. Wisc.

MUMMIFY flowers in natural colors! Tints. Pearl. Metal! Details free. R. O. Morgan. 6230 Myrtle Ave.. Long Beach 5. California.

ROLL-On Curtain Pinner. 25c Postpaid. Salesmen. M.O. Dealers 150% Profit. Yarger Tool Co.. Dept. S. Morgantown. W. Va.

SAVE! Million articles wholesale. Directory 10c. Lawsan. Box 1302-A5. Detroit 31.

LEARN to publicize yourself for increased income in your business or profession. Details free. Publicity Systems (PS). Box 322. Jacksonville. Illinois.

OPERATE home business that may mean the road to independence. Write. Sunray. 4756-B N. Bernard. Chicago. Illinois.

START Home plaster novelty business. Amazing course tells how. Literature free. Kemo-Courses. 4862 Catalpa. Chicago 30. Ill.

MAILING postcards selling repeat merchandise is profitable. Everything supplied. Details free. Gordon Publishers. Box 23. Pawtucket. R. I.

$46 FROM Square Foot Plywood; Jigsaw necessary. Write; Woodart. Bridgewater. Massachusetts.

MAIL order business your opportunity. "How To Build Your Own Mail Order Business." Beginner's idea-book tells how. Quarter. postpaid. Satisfaction warranted. Gilchrist. 622-S. Mass. Ave.. N.E.. Washington 2. D. C.

SHARE in the profits of a nation wide business without losing one cent or doing any work. By all means let me send you details. You must not miss this opportunity. Write to Chamberlain Auto Mask Mfg. & Sales Co.. 1007 Shady Ave.. Johnstown. Penna.

DO it with Sea shells. Profitable. easy home work. free lesson. C. Werts. Sharp Park. California.

TEN moneymaking home business opportunities. Details. 25c. Crawford. Box 1161. Bridgeport. Conn.

BOOKKEEPERS—Double your income in your own bookkeeping business. Be independent! Part-full time. day or evening. $500 month easy! New plan proven phenomenal success! Write for unusual offer. Auditax Systems. 4513-B Sunset. Los Angeles 27.

MONEY daily. spare-time business. Write today. American Letter. New Market 1. New Jersey.

CREPE Paper flowers. Waxing. Party decorations. Learn Quickly. Professional moneymaking course. 35c. Millett Crepecraft. 3754 Menlo. Dept. 15. Cleveland 20. Ohio.

CASH in on the Building Boom! Make building blocks right in your own backyard. Amazing new. high speed. Concrete Vibrator Block machine only $199 makes 1000 blocks a day. Free literature tells how to start your own profitable business. General Engines Company. Dept. H. Drexel Building. Phila. 6. Pa.

WATCHES. Wholesale. Rebuilt Elgins. Walthams. Bulovas. etc.. $9.75 up; new and used diamond. railroad. 21J wrist. Catalogue free. Brookings. B-Y1975. Little Rock. Ark.

OPERATE profitable mail order business. Splendid opportunity. For details write Percy Allen. P. O. Box 132-B. Ganges. Mich.

IF you are interested in legitimate. permanent business of your own. starting $5000. increasing steadily—Write us. Magic-Plastics Corp.. Forest Park. Ill.

Copyrighted material

MFG. will sell soap processing machine. furnish formula. train buyer. One machine will be sold in each city. Splendid opportunity. $750. Investment. Cross Company. 1817 South Kingshighway. St. Louis. Mo.

TRAVEL by freighter. Service available to all ports throughout the world. Comfortable. economical. Send $1.00 for full Particulars. Freighter Travel Bureau. 2031 Caniff. Detroit. Michigan.

MANUFACTURE small electronic device in your home without experience. Demand everywhere. Guaranteed. Plans $1.00. Electronic Service. 32P Kenmore. Newark 6. N. J.

FOR more business. operate an individual business office. exclusively under your own name. Rates $10.00 and $18.00 yearly. Cooperative Office Service. 126 Lexington Avenue. N. Y. 16.

MANUFACTURE Yourself: Cleaners. Polishes. Cosmetics. Formula Catalog free Kemico. 10. Parkridge. Ill.

GET 400 money making ideas. Formulas. Plans. Schemes. Folio free. Formico Prod.. Box 572. Dayton. Ohio.

4' X 8' OUTDOOR aluminum popcorn stands. Spring delivery. Evans Metal Products. Elkhart. Indiana.

SELL!! Balloons. Combs. Specialty Merchandise. Carleton House. Distributors. Texas City. Texas.

HOBBY and Opportunity. Big Mail 10 cents. Dr. Korstoft. Randers. Denmark.

DIRECTORY of Foreign Manufacturers. Wholesalers—25c.—Bison Research. Buffalo 8. Minnesota.

START a clock shop while clock repairing is booming. Our easy to learn home study course with pictures and illustrations teaches you how to repair all kinds of clocks. Information free. Houston Clock Shop. P.O. Box 5086B. Houston 12. Texas.

TYPEWRITER Repairmen urgently needed. Earn $40 to $50 weekly spare time. Our easy to learn home study course teaches how to repair typewriters. Write for free information. Houston Typewriter Repair Service. P.O. Box 5357. Houston 12. Texas.

ANALYZE Handwriting for Profit! Complete outfit $1.00. Graphologic. POB-971. Philadelphia.

SELLS on sight. Sensational Luminous Powders that shine in the dark throughout the night. Enormous demand. No competition. Big profits to agents and users. Free Listing of colors and information with your special trial order for $1.00. Glowell Engineering Company. 475 Fifth Avenue. New York 17. N. Y.. Dept. B.

MEXICAN imports. curios. Free Wholesale Catalogue. Quivera Specialties. Topeka. Kansas.

LEARN To Write. Design and Sell Advertising!—Start own agency or work for big firms. "How Folder." free. Mastercraft Enterprises. 10 West Ohio. Indianapolis 4. Indiana.

METALLIZE baby shoes for pleasant profits. Many methods. Details free. Enterprise. Box 189-SE. Wilkes-Barre. Pa.

FLEXIBLE Molds to order. also originals. Professional course manufacturing molds and cast novelties. Latex, lacquers. flocks. flocking equipment, supplies. Plastics. Box 1574. Boston 4. Mass.

GENUINE Natural Latex for rubber molds. Only two coats necessary for thick mold. Make money reproducing statuary. plaques. novelties. Low cost. Write Major Chemical Company. 131 Inman Street. Cambridge. Mass.

57 MONEY MAKING OPPORTUNITIES

ELITE Collection describes 137 money-making plans; local. mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

DETECTIVES Earn Big Money. Experience unnecessary. Particulars free. Wagoner. P-125. West 86th. N. Y.. N. Y.

SEWING Machine Repairmen make big money lifetime. Start neighborhood shop. Complete service manual. covering all makes. $1.98 postpaid. Money Back Guarantee. Sewmachine Serviceman. Hamilton AA. Ohio.

METALLIZE baby shoes. Further information — 3c stamp. Metal Crafts. Box 125-R5. Tampa 4. Florida.

21 POPCORN. Candy Apple. etc. Formulas. All money-makers. $1.00. We can supply equipment. Concessions Supply Co.. Dept. "B". Box 133 Sta. "B". Toledo. Ohio.

TECHNICAL bulletin listing. 24 Opportunities. Free. Public Educational Service. 493 Irving. Bridgeton. N. J.

IF you work in a factory or shop. you are passing up the opportunity of a lifetime to build a steady Extra Income by selling subscriptions to Popular Science Monthly to your fellow employees. For free kit and complete instructions write on a postcard to—Manager of Agents. Dept. A148. Popular Science Publishing Co.. Inc.. 353 4th Ave.. New York 10. N. Y.

WANTED home workers: Easy work. children can help. Send 25c deposit. (Credited) for details. and 50c value surprise. Bishop Novelty's. Box 877. Milwaukee 1. Wis.

QUICK profits ingenuous leveling device sells $3.00. you make $1.50. Homeowners. builders. contractors. Masons. farmers. buy on sight. $1.50 brings working sample. Aqua-Level. Taylorsville. California.

UP to 500% profit with farm specialties. Free details. Pont. Box 635. Terre Haute. Indiana.

EXTRA Money? Free details. Trable. 1018½ Elm Street. Dallas. Texas.

MANUFACTURE costume jewelry at home for profit. hobby. therapy. Free wholesale supply catalogue. Instructions. Florida Supply House. Bradenton. Florida.

WIN contest money. General Contest Magazine gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests. 1609-A East 5th. Duluth. Minn.

UNPAINTED Plaster Ornaments: Beautiful designs. easily decorated with water colors or oil paints. Profit or Hobby. Illustrated List Free. distributors of New Loxite. A Firestone Product. for Molds. Midwest Novelty Mfgrs.. 108 Cedar. Anaconda. Montana.

PRIZE Contest Fans Reap Rich Rewards. Enclose 3c stamp. National Contest Bulletin. Box 2685-S. Miami 31. Fla.

SENSATIONAL opportunity. Earn $100 weekly 16 different ways "Cashing-In On Fluorescent Lighting." Make beautiful lights (complete) from scrap parts. Amazing illustrated details free. Willis Fluorescent. 101 York Street. Brooklyn 1. New York. Dept. A.

START your own business! Big money manufacturing novelties. plaques. statuary. Free catalog. Write Bing Products. 88-B5B Broad Street. Boston 10. Mass.

WIN Contest money. send 25c guaranteed instructions for writing winning answers. Winacontest. 22 Westlake Ave.. Auburn. New York.

WOULD You pay 3%—first $350 made? Color-illustrated book "505 Odd. Successful Enterprises" free. Expect something odd! Pacific. Oceanside. California.

GET 400 Success Plans. Ideas. Amazing formulas. Schemes. Folio free. Formico Crafts. Box 572. Dayton. Ohio.

EARN money evenings. copying and duplicating comic cartoons for advertisers. Adservice. Argyle 2. Wisconsin.

EARN up to $2.000 year. inventing simple items. Special cash markets. Hendrickson. Argyle 8. Wisconsin.

START Home Mail Business! Takes only few dollars. No experience—good earnings. "How Folder." Free! Shutt. Box 269. Newcastle. Indiana.

MONEY from Sawdust. Tin Cans. Fishworms. Ashes. Termitekill. Instructions 25c each. All five $1.00. Charles. 12-EN. Norwood. Ohio.

A $100-a-Month hobby at home! No soliciting. no mail order. no meeting people. Easy. enjoyable pastime. Details. 25c. (Refundable.) Laura Dickson. 1006-PS Elizabeth St.. Anderson. S. C.

ELECTRIC Clocks are everywhere you go. buildings. homes. parking-lots. factories. Repairs increasing. Our easy to learn course with pictures and drawings teach You how to repair these clocks. Electronic Supply Co.. Box 2350-B Houston 1. Texas.

58 FORMULAS, PLANS, ETC.

137 MONEY-making plans, also formulas for salable products. Descriptive booklet free. Elite Co.. 220-A Grand St.. N. Y.

TRADE Secrets. 10.000 formulas. 900 pages. $3.00 Postpaid. Natco Supply. 1090 W. 43rd. Norfolk 8. Va.

10.000 FORMULAS and trade secrets. Free literature. Stillmans. 555 Kingston Ave.. Brooklyn 3. N. Y.

400 MONEY Making ideas. Formulas. Mfg. secrets. Amazing folio Free. Formico-NA. Box 572. Dayton. Ohio.

LABORATORY tested formulas. Lists free. Pont. Box 635-PS. Terre Haute. Indiana.

SUDSY inexpensive fluffy bead detergent. Formula. one dollar. Satisfaction Guaranteed. J. Dick. Box 5641. Indianapolis.

59 PLASTICS

PLASTIC—Sheets. Rods. Tubes. etc. Free List. Plastic Supply Co.. 2618 St. Louis Avenue. St. Louis 6. Mo.

LUCITE. Plexiglass. All size sheets. Cost square foot (12 x 12) 1/16" 90c; ⅛" $1.16; 3/16" $1.43; ¼" $1.68; 5/16" $2.09. Include 10% postage. Almac Plastics. 230 5th Ave.. New York 1. New York.

EMBED keepsakes. coins. flowers. biological specimens in amazing liquid plastic (clear colors) producing beautiful castings within half hour. Complete kit $2.90 (U.S.A.). D. B. Munson. Dep't. B-5. Box 401. Evanston. Ill.

MAKE Plastic Jewelry. Free information. Attler Company. 23-60 29th. Long Island City 5. New York.

INTERNAL Carved swans. bluebirds. goldfish. butterflies. etc.. pins. $1.50. Rose or Daisy costume jewelry sets. $1.50 less findings. Also gifts and novelties. Crystal Floral Novelty Co.. Somerville. New Jersey.

LUCITE and Plexiglas remnants. masked Generous assortment $1.00 postpaid. Box 989. Metro. Station. Los Angeles 55. Calif.

SUMMER Special. 1 each 6" x 12" Masked Plexiglas Sheet. 1/16". ⅛". 3/16". ¼" $3.00 Postpaid. Free Listings. Draft Plastics. Somerville 1. New Jersey.

PLASTICS—Sheets. rods. tubes; dyes. Plastic coatings. Shells. findings. craft supplies. Lucite scrap. 25c pound up. Illustrated fabricating manual. price list. 10c. Lucite sample. 35c. Courtesy to dealers. Gen-O'-Lite. 5350G Riverton. North Hollywood. California.

60 CHEMICALS AND APPARATUS

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co.. 136 Liberty St.. New York City 6.

LEARN Chemistry at home. from the House of Winn. Home of Supplies for student Chemists. New idea chemical and apparatus outfits for Home Experimenting. Photographic Scales. Semi-Professional Microscopes and accessories. Send 10c for retail catalogue. Established 1931. John H. Winn. 124B West 23rd Street. New York 11. N. Y.

SINKER molds for making your own sinkers. Several styles. many sizes. Free illustrated folder. Reading Instrument Co.. Box 78. Reading. Pa.

SPECTROSCOPE for quick chemical analysis $2. Cutting Sons. Campbell 47. Calif.

FREE catalog: Chemistry. Mineralogy. Biology. Physics. Tracey Laboratories. Evanston. Illinois.

LABORATORY Supplies: Chemicals. Glassware. Etc. Low prices. Large catalog 15c. Microscopic Stain Catalog 20c. Both for 25c. National Scientific Company. Established 1908. 2204 W. North Ave.. Chicago 47. Ill.

INTERESTING catalogue. chemicals. rare elements small quantities. etc. J. B. Herron. Vicor Laboratories. Gueneville. Calif.

CHEMICALS and apparatus for industrial. analytical. and private laboratories. Complete supply service for correspondence school students. Send 10c for catalog. Dept. M-26. Biological Supply Co.. 1176 Mt. Hope Ave.. Rochester 7. N. Y

CHEMICALS. ounce quantities. apparatus. catalog 10c. Fleischer's Laboratories. Everett 49. Mass.

COMPLETE 1948 Catalogue. Send 10c. Lab Chemical. Box 206-D. Oak Park. Illinois.

COMPLETE Supply Catalog. 10c. Pilgrim Chemical. 348-FF Edith. Salt Lake City 4. Utah.

CHEMICALS in all grades and quantities; Cat. $.10. Celtic Chemical Co.. 2619 Ocosta Ave.. Cincinnati. Ohio.

61 HELP WANTED

BOYS Wanted. Over $50 week! Sell name plates for front doors. Write National. 214-R Summer. Boston. Mass.

SALESMEN: Big money showing building owners sensational product; cuts essential repair cost up to 75%. Six average orders weekly pay you over $190.00. Age: 30 or over. Get moneymaking facts. Write. Zone Co., Dept. E8, Box 789, Ft. Worth 1, Texas.

INSTALLATION and Service Men wanted now by authorized Iron Fireman dealers. Stokers, oil and gas burners, automatic coal, oil, gas furnaces, boilers, electric controls. Steady work. Good wages. Advancement opportunities. Write, stating experience and locality preferred. Address Engineering Service Department. Iron Fireman Mfg. Co., 3182 West 106 St., Cleveland, Ohio.

INTERESTED in Latin American and foreign employment? $1.00 brings copyrighted Foreign Service Directory with Hot list of concerns interested in oil, mining, aviation, construction, transportation, manufacturing. How-when-where to apply. Global Reports, Dept. PS, P.O. Box 883, Hollywood 28, Calif.

"ALASKA—The Last Frontier" offers thousands of excellent opportunities. $1.00 brings government map and copyrighted Report with authentic listing of fishing, mining, fur farming, prospecting, aviations, construction, homestead lands. Alaska Opportunist, Dept. PS, Box 883, Hollywood 28, Calif.

IF you work in a factory or shop, you are passing up the opportunity of a lifetime to build a steady Extra Income by selling subscriptions to Popular Science Monthly to your fellow employees. For free kit and complete instructions write on a postcard to—Manager of Agents, Dept. A148, Popular Science Publishing Co., Inc., 353 4th Ave., New York 10, N. Y.

RELIABLE man with car wanted to call on farmers. Wonderful opportunity now. $15—$20 in a day. No experience or capital required. Permanent. Write today. McNess Co., Dept. 80, Freeport, Illinois.

FOREIGN Employment! List of 150 companies with foreign interests $1.00 or C.O.D. Foreign Service Institute, Box 3934 J Miami 24, Fla.

GET a better job by writing the proper letter. Booklet shows how. 7 day free examination. Pay $1. only if fully satisfied. VGA Publishing Co., 2020 Boston Rd., N. Y. 60, N. Y.

SALESMEN: Excellent openings with authorized Iron Fireman dealers. Attractive salary and commission. Make good money selling top quality, nationally advertised Iron Fireman coal stokers, oil and gas burners, automatic coal, oil, gas boilers and furnaces. Excellent individual sales training course and selling equipment. Write for information, stating locality preferred. Iron Fireman Mfg. Co., 3184 West 106 St., Cleveland 11, Ohio.

PARAMOUNT Revolutionary Self Filling Instant Drying Pen Brush. State Rights available. Send $2. for working sample with information. Paramount, 1189 Bway, N. Y. 1.

EARN Up to $520. Month part or full time keeping books for small firms. Simplified System. Write Tax-Saver System, Dept. O, Ft. Worth, Texas.

62 AGENTS WANTED

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late method. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. G, Decatur, Illinois.

LICK After-war layoffs; Start own business; home, office. Booklet describing "Collection of 127 Tested Plans" free. Elite Co., 220 Grand St., New York.

EXCELLENT Sideline for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also, make money with our line of Automobile Initials and Sign Letters. Free Samples. "Ralco", XL-Roxbury, Boston 19, Mass.

SELL Delicious Candies, Nuts, Gum. Immediate delivery. Write Casterline, 2031-SH Sunnyside, Chicago 25, Ill.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co., 437 N. Clark, Chicago.

GOLD lacquered Window Sign Letters. Large Sizes Penny Each. New Foils. Absolutely Beautiful. Free Samples. Atlas, 544 W. 79th, Chicago 20.

A DRESS yours with every 3 you order for yourself and family. Amazing new bonus plan. Everything Free. Harford Frock, Dept. M-9129, Cincinnati, Ohio.

JOBS Open In Selling! Send name, address for Free copy Opportunity Magazine, listing hundreds of companies who need men now, full or spare time. Experience not essential. Opportunity, 28 E. Jackson, Dept. 15, Chicago 4, Ill.

FREE Sample! Big profit opportunity with amazing Glow-In-The-Dark house number, switch plates, pictures, decals, religious articles. Represent large manufacturer. Madison Mills, 303 4th Ave., New York, N. Y.

ADVERTISING book matches—Cash in on Political campaigns—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-58, 7530 Greenwood, Chicago.

MAGIC Cleaner and laundry soap deal. Hotter than a firecracker. Big Profits. Sample free. UCO, 5007 Irving Park, Chicago.

WHOLESALE! Balloons — Novelties — Watches — Jewelry — Premium Goods. Collins Co., Forsyth 2, Georgia.

RESTAURANT Salesmen—New fast selling sideline that nets 200%. Sample free. Theron Fox, 1024A Carolyn, San Jose 10, Calif.

FREE nylons given if Kendex hosiery runs or snags! World's only women's hosiery sold with a written guarantee that amazes everybody. Mere words could not possibly express the almost unbelievable opportunity you now have to make money. Fantastic and "impossible" earnings now become a reality. Can you imagine a guarantee that replaces hosiery regardless if damage is due to use or abuse and regardless whether it is the fault of the hose or the wearer? Here is sales dynamite that will blast your earnings to the sky! Even if you never sold a thing in your life, three magic words: "Guaranteed Against Everything" will open doors for you—will make women listen and will pour money in your pocket. Kendex stockings are not sold in stores, so you have no competition. Complete line includes beautiful sheer nylons; long wearing, durable service nylons; three different lengths; genuine outsize nylons; latest shades; choice of full fashioned with seams or seamless; lowest priced rayons. Also separate complete line of men's hosiery including nylon, lisle, rayon, cotton, mixtures, etc.; plain and fancy; long and short. Thousands of pairs shipped daily. No money or experience needed. Nothing to invest or risk. No samples to buy. Nothing to pay, now or later! Simply write orders. We deliver and collect. Liberal advance cash plus huge cash bonus. Write orders spare or full time; exclusively or as a side line. Become a manager and appoint others to sell for you with steady income on their sales! Complete money-making outfit, including sales books in colors, samples cut from actual hose, instructions, order blanks, etc. furnished free and prepaid. Rush name and address on postcard and start making money next week. Kendex Co., Babyon 136, N. Y.

LOOK, Here! Wanted—men to start in business on our capital. Sell some 200 farm-home products. Thousands our dealers now make quick sales, big profits. For particulars write Rawleigh's, Dept. E-192-PSC, Freeport, Ill.

BIG Money Quickly and Easily taking orders for complete line Personalized Initialed Buckles, Belts, Cap Badges, 2,000 Emblems. Fast repeats. Write today. Hook-Fast Company, Box 480-PS, Roanoke, Virginia.

MAKE more money selling personal initialed individualized belts, buckles, cap badges, tie holders, name plates, 2,000 emblems to choose. Big profits, whole or part time. Write today—special outfit order. Hookfast Specialties, Box 1425, Dept. 7, Providence, Rhode Island.

DOUBLE duty shopping bag. Zips open. Instantly changes from small to large size. Lightning seller. Samples sent on trial. Kristee 122, Akron, Ohio.

$1 STARTS you in business. Sell DeLuxe ties, 100% wool interlining. Costs you only $7 per dozen, you make $5.00 dozen. Send $1.00 for special introductory offer two DeLuxe ties. Catalog complete line Free. Philip's Neckwear, 20 West 22nd St., Dept. P-22, New York 10.

IF you work in a factory or shop, you are passing up the opportunity of a lifetime to build a steady Extra Income by selling subscriptions to Popular Science Monthly to your fellow employees. For Free kit and complete instructions write on a postcard to—Manager of Agents, Dept. A148, Popular Science Publishing Co., Inc., 353 4th Ave., New York 10, N. Y.

SELL Gold embossed monogram stationery. Sample free. Dunbars, Sanford, Florida.

MAKE $15.75 up per dozen. Genuine leather hand painted zipper wallets. Today's sensation. Sell stores and direct. Your cost only $14.25 doz. Quantity discounts. Write today for free catalog wallets, billfolds, ties, belts, items for whole family. Golden Novelty, 648 Broadway, Dept. C-1, New York.

AMAZING Possibilities. Exclusive religious specialties. Colonel Smith, 1211 Chestnut, Room 603-C, Phila. 7, Pa.

SILVERWARE, Cleaning, Plating, Polishing. Liquid (Nusilver). Apply with cloth. Contains genuine silver. Renews silverplated ware, articles, pieces. Silverplates brass, copper, bronze. Part full-time, agents wanted. NuProcess Products, Aurora, Illinois.

EARN Big Money Year 'round. Be a one-person-department-store. Take orders for shirts, ties, hosiery, lingerie, Household linens, etc. For information Corporative Merchandisers, Dept. PS3, 110 West 34th Street, N.Y.C. 1.

"IDEAL business stamping metal key protectors, social security plates. Information upon request. General Products, 11 No. Pearl (PS), Albany, N. Y.

GET in the magazine subscription-renewal business. Pays liberal commissions. No capital needed. Helps furnished. Repeat sales come automatically. Wholesale Catalog Free. Write McGregor Magazine Agency, Dept. 13, Mount Morris, Illinois.

BIG Profits Fast! Sell Plastic Tablecovers, Curtains, Garment Bags, Twenty other items. Swatches Free. Star, 261 Fifth Ave., Dept. P, N. Y.

GREETING Card Moneymakers. Birthday, relations, Father's Day. Catalog free. Greenport Art Company, Dept. 856-C, Brooklyn 15, New York.

DENTAL-Sterno—The New Toothbrush Holder and Sterilizer for money-making salesmen. Used in every home! Big profits. Write Dental-Stero Company, 3908 Secor Road, Toledo 6, Ohio.

AGENTS Wanted for our Slot Machines and coin operated amusement games in every town and community. Sell to clubs and homes, or start a route. Webb Distributing Co., Dept. P40, 6 So. Kedzie Ave., Chicago 12, Ill.

INFORMATION — Wholesale supply sources. Moneymaking plans. Increase your income. Write Reynard Station, Smithfield 3, Ohio.

POCKET Pal: Replaces Pocket Knives. New, Safe, Beautiful. Always razor sharp. 50c seller. 231% profit. $15.00 or more daily. Agents, Salesmen, Distributors. Samples 10c. Nelson Mfg. Co., 222 W. Kellogg St., St. Paul 2, Minn.

WHERE to buy 800,000 articles (household appliances, clothing, etc.) Wholesale! Write for your Free Club Membership. Glass Pub. Co., Dept. 103, Ellwood City, Pa.

SELL Beautiful steel bed lamps. Louverlite, direct to user. Retails $3.95. Wholesale $2.37. Sample $2.77. Write for circular. Randolph Manufacturing Company, Kilgore, Texas.

PROFITS to 100% selling everyday greeting card assortments. Details and assortment on approval. Glorian, Dept. 20, 515 East 45th Street, Brooklyn 3, New York.

100% PROFIT Electric Gas and Cigarette Lighter. Write Box 171, New York 5, N. Y.

GUARANTEED product in protected territory, if you are now selling or intend to sell house-to-house. For full 1 Qt. Sample amazing High Shine Windsor No Rubbing Wax, send only 25c covering handling and postage. (Sells for $1.25). Windsor Wax Co., Inc., Dept. P.S.-2, Hoboken, N. J.

DISTRIBUTORS! Very profitable product for Automotive Shops. Northlake Co., Peoria 4, Illinois.

SELL Ultra blue stock signs to stores. 1000 slogans, comedy, general, religious. 7 x 11, cost 6c, sells 35c. Make money. Sample free. Lowy, 8 West Broadway, Dept. 378, New York City (7).

Copyrighted material

SELL leading phonograph records. Part-time. Home-Service. 55 W. 42nd. N. Y. 18.

MAKE $500.00 A Week!! Be First with "Neo-Fluorescent" Revolutionary Invention! New Type Fluorescent Sign Replacing Neon. Fantastic Virgin market with Dealers. Mfgs. Distrib. nets Fabulous Profits. Free Sample offer. H. Rose Co., 539-C So. Franklin. Chicago.

LAWN Mowers—complete line. Lowest priced. Display Kit—Free. Rotacut. M-2015. Excelsior Springs. Mo.

WOULD you pay 3%—first $350 made? Color-illustrated book "505 Odd Successful Enterprises" free! Proven! Work at home. office. Expect something odd! Pacific. Oceanside. California.

$3 FIRE Extinguisher sells wholesale or direct. "Fire-Killer", 101 Franklin, Syracuse 1. New York.

SELL new. used clothing from home. auto. store. Wholesale catalog Free. Calumet Sales. 4719 Kennedy Ave., East Chicago. Indiana.

AMAZING invention. Needed by thousands. 500% profit. Send quarter for samples full details. Refundable. Krueger. Box 812-S. Oakland 4. Calif.

SENSATIONAL new discovery. Ink-N-Trol ball pen with priming piston. Cannot stop writing. guaranteed. Dollar Distributors. Box 26. Morris Hgts. Sta., New York 53.

MAKE Sensational Profits! New. sell-on-sight Plastic Line: Tablecloths. Aprons; many other splendid fast-selling items. novelties. Postal brings free details. special deals. Hurry! Royality. Box L-748. Passaic. N. J.

SALESMEN. Brilliant fluorescent Neon border trim on Buildings. Windows. Walls. Lots. creates favorable comment. attracts attention. assures fabulous sales increase. Ideal for Nite Spots. All Business. City and Rural Areas. Proven mechanically perfect. Complete unit of Ten 5-Foot lengths. choice six colors. Guarantee highest quality. no junk. and to deliver everything necessary to install. simple instructions included. Nothing mysterious. No tricks. Price $50 ⅓ Cash. Your profit $40 up. depending upon your ingenuity. Post card brings particulars. T. D. McCurley. Pensacola. Florida.

MAKE money at home like I do! Write immediately. Duffy (5). Covington. Ky.

DISTRIBUTORS—Increase your income! Wholesale supply sources. Moneymaking plans. Write Bowden Service. Box 0673. Toledo. Ohio.

MEN Now Calling on Stores to introduce fast-selling carded foot product. Repeat order. Big Profits make this a "natural." Rush name for facts. Pera Mail Order Company. Box 5047-A. San Francisco 14. California.

BIG Profits. Sell Photo Enlargements. Photorich. 215 W. 98th. New York City.

AGENTS—sensational pen. Writes 2 colors. Gold Plated. Retails $1.25. Sampa Company. 1120 Brighton Beach Avenue. Brooklyn 24. N. Y.

63 HIGHGRADE SALESMEN

START Your own business on our capital. Always your own boss. Hundreds average $6.000 to $25.000 annual sales year after year. We supply stocks. equipment on credit. 200 home necessities. Selling experience unnecessary to start. Wonderful opportunity to own pleasant. profitable business backed by world-wide industry. Write Rawleigh's. Dept. E-U-PSC. Freeport. Ill.

FANS—Fans—Salesmen making $50.00 to $100.00 per day selling our Electric fans. Sump Pumps and portable water softeners. Have also. all kinds of fan parts; build your own. Write Universal Fan Co.. Peru. Ind.

$240.49 IN ONE week—Unusual? Not at all! Just look at one week's earnings of these representatives. WWS $290.99. JMH $229.75. RJR $262.47. VJM $275.95. JEA $240.49. RWF $231.21. Direct mail campaign brings hot leads right into your home. Remarkable product does part of 10 men's work—a "natural" during these labor problem days. Has perfect sales story —sells year 'round. As modern as Radar! Special demonstrator offer. We extend credit. deliver and collect. No capital required—no experience necessary. You make big profit on first sale and full credit on repeat business. Every business. store. factory. etc., are prospects. Write John Porter, 2433 Indiana. Dept. 331. Chicago 16.

EARN $25 a day and more selling nationally advertised aluminumware. silverware. pressure cookers and jewelry. It is simple. let us show you how to make big profits with no investment. Write Continental Products. Dept. C4, 30 Ormsbee Avenue. Providence. R. I.

67 EDUCATIONAL AND INSTRUCTION

HAVE your own office! Many earn up to $5.000-$15,000 Annually. Learn credit-collection agency business by home study course. Experience unnecessary. Write for Free bulletin. No obligation. Franklin Credit School. Dept. 203-E. Roanoke 7. Va.

ASSOCIATE in Arts diploma earned by correspondence. University Foundation. PS. St. Augustine. Florida.

END Job Worries for Life! More than 10.000 new Government Life-time jobs every month. Start high as $3.021 year. Men—women. Prepare now for next examination. Vets get preference. Booklet Free. Write: Lincoln Institute. 7951 Yates Avenue. Chicago 17. Illinois.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or Spare time. Details Free. No obligation. Ellis. Box 203. Cedar Grove. North Carolina.

DYNAMIC Thought—The Secrets of Mental Fascination. Improve your mental powers. be a success in business. earn more money. Send today for this amazing new book. $3.98 postpaid. Milton T. Clements. Avon Park. Florida.

DENTAL Technician Training. Easy Home Study. Details. Dental Crafts and Sciences. Box 1321. Palo Alto. Calif.

REPORTING: Public. Court. Veteran Approved: Stenotyp Secretarial School. 911 Locust. St. Louis 1.

LEARN Piano Tuning. Prepare for Career in fascinating profession. $5.000 year easily earned. Real security. pleasant easy work. No profession Paying so well can be mastered so quickly. Natural Aptitude. desire to get ahead chief requirements. Prospectus and full information on request. Harmony School of Piano Tuning. Box 582. Harrisburg. Pa.

CLINICAL Laboratory Technicians in great demand. We train you in your spare time. in your own home. You can practice while studying. Write for free catalogue. Imperial Technical Institute. Box 973-B. Austin. Texas.

SHORTHAND. Professional. high speed. Learn in 21 days. $1.00. Gaer. 1212 Lincoln Place. Brooklyn 13. N. Y.

WELDING—a profitable trade. Demand for trained men. Learn quickly at best equipped school in U. S. G.I. approved. Catalog free. Write Hobart Welding School. Box P-585. Troy. Ohio.

VALUABLE information on your memory; famous feats of memory; Supermemory; free. Write today. Thor Books. CS-5 Box 1210. Chicago.

KNOWLEDGE Personalized educational courses. Write instruction desired. Welco. 1203 19th. N.W.. Washington 6. D. C.

SHOE repair school. Teach you quickly! Age 18 to 60. In 12 weeks you can be skilled. Modern Shoe Rebuilding. 4577 Hollywood Blvd., Los Angeles—2935 Belmont. Chicago.

LEARN Elements of Radio at Home. Ideal course for beginners. $15.00. Write Waca Radio School. 1421-X Sixth Street. S.E.. Minneapolis 14. Minn.

STUDY Real Estate. Write DeVoto Schools. 35 Vincente. San Francisco 16. Calif.

69 CONTESTS

$1.000.000 FREE—Yearly—Contests. Win fortune. We prepare entries—lowest cost. Write. Research. 13 Earl Street. Red Bank. New Jersey.

CARS . . . Cash . . . Homes . . . Free to lucky contest winners. Win your share with our Contest Aids. $1.00 brings Prize Contest Bulletins. Winning Answers. Entry Blanks. Free Information. Personal Contest Club. Box 12-P. Station P. Brooklyn 12. New York.

WIN contest prizes. cash! "Here's How." Alfred Novak. 2601-S. Division. Cleveland 13. Ohio.

70 LANGUAGE OUTFITS

LINGUAPHONE Makes Languages Easy at home. Learn to speak Spanish. Portuguese. Italian. French. German. Russian. by quick. easy Linguaphone conversational method. Save time. work. money. Linguaphone Correspondence Courses are available to veterans under G.I. Bill of Rights. Send for free book. State if G.I. Linguaphone Institute. 54 RCA Bldg.. New York 20. N. Y.

73 BUSINESS SERVICE

COMPLETE container service for mail order trade. Request folder. David Kapor and Company. 617 Brooklyn Ave.. Brooklyn 3. N. Y.

74 CARTOONING, SIGN PAINTING, DRAWING AIDS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is Free; no obligation. Simply address Cartoonists' Exchange. Dept. 195-C. Pleasant Hill. Ohio.

SIGN painting taught at home by an old master. Ben Kerns. Box 812. Greenville. S. C.

9 ALPHABET 3 Numeral Pattern Sets and Catalog $1.00. Sign Letter Distributors. P. O. Box 101. Mineola. N. Y.

IT Pays to Draw! Sensational new condensed Cartoon and Drawing Course shows how. Pocket size! Over 70 illustrations! Complete. $1.00 postpaid. Vane Company. Box 98a. Bergenfield. N. J.

SIGNS made easily. Instructions and ten sets modern alphabets. numerals. patterns. Sizes up to eight inches. All for $1.00. Co-operative Business. 7 West Madison. Chicago (2).

"CARTOONS and drawing." 31 lessons. $1.00 (refunded). Catalogs. 10c. Stone. Luenburg 30. Mass.

75 CHALK TALK-STUNTS

CHALK Talks, Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda. Oshkosh. Wisconsin.

76 TYPEWRITERS

REMINGTON Portable Typewriter $84.27 Inc. Tax. Hastings Typewriter Co., Hastings. Nebr.

RETAIL at wholesale prices. Singer Typewriter Company. Dept. 1. 562 East Fordham Road. New York. N. Y.

RECONDITIONED Typewriters. Printing Devices. Office Appliances Supplies Dixiegraph. King. N. C.

77 OFFICE SUPPLIES & EQUIPMENT

MAGIC Mailer Envelope Sealer $4.95; Post Card Duplicator $13.50; Office Supplies; Celulose Acetate; Agents Wanted; Speed-Dee. 3229PN. Sheffield. Chicago 13.

78 RUBBER STAMPS

3 LINES, cushioned indexed 50c Pads 35c. Print-Right, Wauwatosa, Wis.

RUBBER Stamps: 1 line $.50. 2 lines $.75. Signature $2.75. Stamp Works. Hastings. Nebraska.

DELUXE Cushioned. indexed. knob handle; Three lines $1.00. two 75c. Quick Service. Catalog 10c. Warner Stationary. Box P-43. Havre de Grace. Maryland.

RUBBER stamps. Illustrated literature free. Lee-Vall Press. Dept. 4-D. Box 1242. Indianapolis 6. Indiana.

79 PRINTING OUTFITS, SUPPLIES

PRINTING outfits. type. Send dime for illustrated supply book. Kelsey H8. Meriden. Connecticut.

"PRINTOMATIC" Self-feeding Post Card Stencil Printing Duplicators $9.50 Up. Office Size Duplicators. Speedoprints. Hilcos. Excellographs $33.41 Up. Literature Free. Pittsburgh Typewriter Supply. 336 WE Fourth Ave.. Pittsburgh 22. Pa.

PRINTING Presses. Type Supplies. Lists 3c. Turnbaugh Service. Loysville. Penna.

INEXPENSIVE home-made printing press. Details free. Novelty Shop. Downsville. Louisiana.

MULTIGRAPH machine at sacrifice—real bargain. George Wentz. San Marcos. Texas.

RUBBER Stamps all kinds. catalogue 10c. Print and Stamp Co., Box 172. Boston 1. Mass.

Copyrighted material

HOME-MADE Printing Presses. Write Riegel. 1111 Harrison. Philadelphia 24. Pa.

BARGAINS Type. Weddings. List 3c. LaGarza. 8 Walden. Cambridge 40. Mass.

80 PRINTING, MULTIGRAPHING, ETC.

1,000 BUSINESS cards printed prepaid $2.50. Reliable Print Shop. 901 E. Jefferson. Louisville. Ky.

SIXTY letterheads. forty envelopes. beautifully printed. $1.00. Calder's. Box 3422-PS. Phila. 22. Penna.

SELL Printing. Amazing Profit. Mango. 555-B South 20th. Newark 3. N. J.

QUALITY Printing: Business. personal stationery. State requirements. Samples. Mero Products. 99 Morrison. Punxsatawney. Penna.

SEND 10c Now. for our 48 page price-list—Refunded first order. McCall Press (PSM). 1326 South 27th. Omaha 5. Nebr.

PERSONALIZED Stationery. 50 sheets. 50 envelopes. $1.00. Excelsior Press. 711 Southern Blvd.. Bronx 55. N. Y.

WEDDING announcements. Business Stationery. Cards. Printshop. 176 Fourth. Leominster. Massachusetts.

$50.00 WEEKLY income from Home Mimeograph Shop. Folio tells how. only $1.00. Mimeograph Service. 104 S. Boulder. Russellville. Arkansas.

82 PATENT ATTORNEYS

INVENTORS: Learn how to protect your invention. The United States Patent Office advises the inventor. unless familiar with such matters. to engage a competent registered patent attorney or agent to represent him. We maintain a staff of registered patent attorneys ready to serve you in the handling of your patent matters. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent procedure with "Record of Invention" form will be forwarded upon request —without obligation. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 82B-D. District National Building. Washington. D. C.

INVENTORS—Send today for "Detailed Patent Information" outlining preliminary steps to be taken toward Patent Protection. also convenient "Evidence of Invention" form. Victor J. Evans & Co., 341-E Merlin Building. Washington 6. D. C.

INVENTORS: When you are satisfied that you have invented something of value write me. without obligation. for information as to what steps you should take to secure Patents or Trademarks. Write Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty.. 938 Columbian Bldg.. Washington (1). D. C.

INVENTORS — Patent Laws encourage the development of inventions. The Rules of Practice of the U.S. Patent Office advises —unless an inventor is familiar with such matters—that he employ a competent registered attorney or registered agent. as the value of patents depends largely upon the skillful preparation of the specifications and claims. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow. Berman & Davidson. Registered Patent Attorneys. 1431 Victor Building. Washington 1. D. C.

PATENT practice before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster. Allwine & Rommel. Registered Patent Attorneys. Suite 413. 815—15th St. N.W.. Washington 5. D. C.

C. A. Snow & Co.—S-427. Snow Building. Washington 1. D. C. Registered Patent Attorneys. Write for information.

INVENTORS: Without obligation. write for information explaining the steps you should take to secure a Patent. John N. Randolph. Registered Patent Attorney. 207 Columbian Bldg.. Washington 1. D. C.

INVENTORS. For "Record of Invention" form. contact Carl Miller. Registered Patent Attorney. Woolworth Building. New York.

INVENTORS: Write for free brochure "Evidence of Invention." Labiner. World Building. New York 7.

INVENTOR'S Guide free on request. Frank Ledermann. Registered Patent Attorney. 154 Nassau St., New York 7. N. Y.

PATENTS—Trade marks. Irving L. McCathran. 316 McLachlen Bldg.. Washington 1. D. C. Registered Patent Attorney.

83 FOR INVENTORS

INVENTORS: Learn how to protect your invention. The United States Patent Office advises the inventor. unless familiar with such matters. to engage a competent registered patent attorney or agent to represent him. We maintain a staff of registered patent attorneys ready to serve you in the handling of your patent matters. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent procedure with "Record of Invention" form will be forwarded upon request —without obligation. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 82A-D District National Building. Washington. D. C.

"INVENTOR'S Guide" free on request. Frank Ledermann. Registered Patent Attorney. 154 Nassau St., New York 7. N. Y.

INVENTORS: Without obligation. write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph. Registered Patent Attorney. 206 Columbian Bldg.. Washington 1. D. C.

INVENTORS: The usual First Step is to have a search of the U.S. Patents conducted. so I can report on Patentability. Write. without obligation. Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty.. 939 Columbian Bldg.. Washington (1). D. C.

INVENTORS — Patent Laws encourage the development of inventions. The Rules of Practice of the U.S. Patent Office advises —unless an inventor is familiar with such matters—that he employ a competent registered attorney or registered agent. as the value of patents depends largely upon the skillful preparation of the specifications and claims. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow. Berman & Davidson. Registered Patent Attorneys. 1431 Victor Building. Washington 1. D. C.

INVENTORS—Send today for "Detailed Patent Information" outlining preliminary steps to be taken toward Patent Protection. also convenient "Evidence of Invention" form. Victor J. Evans & Co.. 342-E Merlin Bldg.. Washington 6. D. C.

INVENTORS: If you have an invention for sale. patented or unpatented. write Institute of American Inventors. Dept. 30A. 1926 Eye St. N.W.. Washington 6. D. C.

CAPITALIZE on your invention quickly. Natco—2507-N. 29th St.. Philadelphia. Pa.

PATENT searches—reliable. efficient. air mail service—$6.00. Write for free invention protection form. Patent Research Service. 703 Albee Bldg.. Washington 5. D. C.

CASH For your idea. 280 manufacturers need inventions. patented or unpatented. List free. Invention Bureau. 208 Clinton. Oak Park. Illinois.

MAKE money from your ideas. Write Grayland. 5312 Grace. Chicago 41.

SAVE $50. to $150. Obtain your own patent. Complete Handbook $2.00. International Patent Library. 318 Evans Building. Washington. D. C.

FILE Patents yourself. inexpensively. Information free. Birsh. 712-A Manhattan Ave.. Brooklyn 22.

PATENTED. Unpatented inventions wanted. Immediate sale to manufacturers. Complete inventor's service. Suite 1404. 19 South LaSalle. Chicago.

84 INVENTIONS WANTED

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information. free. Institute of American Inventors. Dept. 30C. 1926 Eye St.. N.W.. Washington 6. D. C.

INVENTIONS Promoted. Patented or unpatented. Write Adam Fisher Company. 183-A Enright. St. Louis. Mo.

PATENTED and pending commercial items for manufacture and distribution. Charges from royalties only. Inventors-Manufacturers Associates. Dept. P.S.. 5 Beekman St.. New York.

SMALL Inventions wanted by manufacturers. I'll help you sell your invention. Write for circular. S. Hull. 7829 Euclid. Cleveland. Ohio.

PATENTED. unpatented inventions wanted. We have tremendous lists of manufacturers who may pay cash. royalties. Descriptive booklet free. National Invention Service. 1404-B Mitchell Street. Oakland 1. Calif.

HIGHEST Royalties—cash. Free literature. Universal Marketing Co.. 126 Lexington Ave.. New York 16. N. Y.

FREE Service. U.S. Industrial Research Committee. 23 Nelson Ave.. Staten Island 8. N. Y.

CASH For your idea. 280 manufacturers need inventions. patented or unpatented. List free. Invention Bureau. 208 Clinton. Oak Park. Illinois.

IMMEDIATE Sales outlet. patented. unpatented inventions. Complete inventor's service. Suite 1404. 19 South LaSalle. Chicago.

SELL Your Invention! Patented or Unpatented! Free information. Sales Research Incorporated. Suite 1102. Chicago Building. State and Madison Streets. Chicago 2. Illinois.

85 PATENTS

INVENTORS: Test the commercial value of your patented or unpatented inventions. quickly and inexpensively. Write for free information. Institute of American Inventors. Dept. 30-B. 1926 Eye St.. N. W.. Washington 6. D. C.

86 PATENTS FOR SALE

REVOLUTIONARY household dusting Mop. seeks manufacturer. Royalty. Henry Seltzer. 1328 Nelson Ave.. Bronx. New York.

88 MANUFACTURING

MODELS small lot manufacturing. metals. plastics. etc.. Millburn. Burlington. Ky.

89 MODELS, MODEL SUPPLIES

MOST complete Illustrated Catalog—"O-HO OO" Model Railroad Parts ever published. Send 5c for mailing. Selley. 1377 Gates Ave.. Dept. 836. Brooklyn. N. Y.

MODEL Ship Builders! Are you looking for authentic, precision ship models? Send for richly illustrated fully descriptive catalogue in full color of famous ships of all kinds. Only 25c. Halesite Yacht Service Inc.. Dept. C-41. Halesite. Long Island. N. Y.

SHIP and Yacht model fittings; blueprints. Send 25c for illustrated catalog No. 21—Listing hundreds of items. A. J. Fisher. **1002-2 Etowah Ave.. Royal Oak. Mich.**

BUILD Model Ships. Railroads. Catalog 10c. Ideal. 21 West 18th Street. New York 11. N. Y.

SHIP model kits and fittings. most complete stock in New England. of Boucher. Fisher. Marine Model. Model Shipways. Fittings. plans. tools. model yacht equipment. Illustrated catalog 25c coin. James Bliss & Co.. Inc.. Dept. M 220 State Street. Boston. Mass.

SHIP Model and yacht supplies. complete large 64 page catalogue. 30c. Wm. Wild. 510 E. 11th St.. New York City.

FREE! Big Train Folder. packed with new Lionel cars. sets and accessories. Madison Hardware Co.. 105-B East 23rd. New York 10.

DYNAMIGIT. Smallest diesel engine ever. ½" high; ¼" wide. long. ⅛" bore stroke. Detailed blueprints. instructions. fuel formula. etc. $3.00. Miller. 118 Center. Willow Grove. Pa.

JET Propulsion powers model plane! Kit $1.79. Herblin. 35-45 79th Street. Jackson Heights. N. Y.

STEAM Engines. fast twins. ¾" x ¾". 11,000 R.P.M. at 50 lb. Drawings. instructions $2.00. Any size designed. Gleason. 2119 Kinney Ave.. N.W.. Grand Rapids 4. Michigan.

POWER Models—steam and gasoline engines. steam traction engine. metals. tools. Catalog 35c. Charles Cole. Ventura. Calif.

STEAM Boiler—for model engines. Uses "Sterno." Withstands 300 lb. pressure. Cast bronze. silver soldered. Complete with pressure gauge and fittings $22.50. Miniature Steam Engine. Working model. Brass and iron. Bore 9/16; stroke 11/16; weight 2 lb. Assembled $17.50. Ross. 68 West Broadway. Section M. New York. N. Y.

TT GAUGE Model railroads. Operating layout on a tabletop. Send for free illustrated folders. Hohn Boyle Sons. 102 S. Wyoming St.. Hazleton. Pa.

Copyrighted material

RAILWAY models, complete line. Combined HO and O gauge, catalogue. 50c. Walthers, 241 Erie, Milwaukee 2, Wis.

SHIPMODEL kits and fittings of authentic design and detail. Model kits include brigs, fisherman, cutter, clipper. New catalog. 15c. Model Shipways, Folio 40, 476 Main St., Fort Lee, N. J.

RADIO Control Planes. Complete. Less than $100.00. 10c please. Hobby Center, 12240 Gratiot, Detroit.

SAVE up to 20% on HO kits, supplies. Write: Model Railroad Roundhouse Gang, Mendota, Minn.

BRASS Gears and model supplies for the inventors. Send 10c for catalog. Pierce Model Works, Tinley Park, Ill.

91 HOME CRAFTSMEN

LEATHER-Crafters: Free 1948 catalog showing easily completed projects, full line of tools, hides and accessories. Ester Leather Co., 145 St. Paul St., Rochester 4, New York.

COPPER Strips, cold rolled, .025 ins. thick. Assortment 5 sizes, 1, 2, 3, 4, and 6 inch widths, 12 inch lengths, $1.90, 24 inch lengths, $3.75 Postpaid. Catalog Free. Groundmaster Company, Boulder, Colo.

SILK SCREEN Process. Start a profitable business or an absorbing hobby. Make colorful posters, cards, personalized stationery. Professionally decorate wood, metal, plastic toys, novelties. Outfit complete with simplified instructions $4.50. Newell Novelties, 15 Scotland Rd., Canandaigua, N. Y.

SPECIAL 77 Full Sized Patterns, Lawn Ornaments, Toys and Novelties. $1.00. Modern Woodcraft, Saginaw, Mich.

LEATHERCRAFT! Complete stocks of leathers, tools, supplies. Immediate shipment. Free catalog. Kit Kraft, Dept. 3203 W. Washington Blvd., Los Angeles 16, Cal.

PATTERNS—45 Pictures of New Jigsaw Projects. Illustrated folder 10c. Joaness, P. O. Box 141, Omaha 7, Nebr.

LAWN chairs, Toys, Novelties, Garden Figures, Furniture, etc. 62 popular plans for $1.00. Mastercraft 5S, 7041 Olcott, Chicago 31, Illinois.

CATALOG: Full size patterns plywood novelty furniture, lawn ornaments, weathervanes, letters, numerals, silhouettes, plaques, frames, toys. 150 craft-hobby books-booklets, decals, tools, picture frame mouldings, etc. Hundreds illustrations. 25c—refunded first order. (No stamps please). Wo-Met Shop, Ashburn, Georgia.

AMAZING New crafts—also weaving, kites, leathercraft, metalcraft, intarsia. Free catalog. Pickwick, 725 West 172d, N. Y. 32.

OUTDOOR furniture. Lawn chairs, benches, tables with wheels. 7 different plans $1.50, 15—$3.00. Summercraft Studio, 42 Vernon St., Dept. KH, Newton 58, Mass.

SILK screening simplified. Instructions for building & operating equipment $1.00. No stamps or checks. Kessler, 254 Hudson, Nampa, Idaho.

BUILD your own dishwasher. Washes dishes sparkling clean! Easy, inexpensive for anyone with simple tools. Complete plans $1.00. Hall, Box 355-E, Leesburg, Fla.

FLOCKING Kit: 6 packages different colored flock, brush, adhesive, designs, instructions. $1.00 postpaid. A & M Crafts, 672 East 91 Street, Brooklyn 12, New York.

93 BUILD IT YOURSELF

BARBECUE Oven—Build it yourself in your own back yard with parts and instructions furnished. Write for free information. Bar-B-Kit, 4723 Troost, Kansas City, Mo.

ROTARY type, power lawn mowers. Complete machines or parts. Modern Mower, Lohrville, Iowa.

ZEOLITE water softener. Original plans for building your own $1.00. Materials available from us. Lake Region, Box 2732-V, Minneapolis 7, Minnesota.

BUILD Your Own Concrete Block Machine-Motor Vibrator or Hand in 2 Days For $10. (exclusive of motor). Free details. Clyde Lee, Mountain View 1, Okla.

DIME brings generous sample assortment—new solid Aluminum Woodscrews, or Machine Screws, Bolts! Bright silvery finish! Rustless! Featherweight! Strong! Mail dime (11c Ohio) Hudson Industries, Hudson, Ohio.

WOODEN Toy—New, Different. Fast selling and simple to make. Plans 50c. Practical Creations, East Troy, Wisc.

PLAYHOUSES & doghouses, scientifically designed. Plans and material list for 4 sizes of either $1.00 postpaid. Miller & Wutkee, 254-D Conant Hotel, Omaha, Nebr.

"CONCRETE Block Homes." 32 page booklet: drawings, instructions on how to build. $1.00. H. C. Lightfoot, Civil Engineer, Richboro, Penna.

"NO Props." Build mechanical clothesline from old auto parts and pipe. Plans $2.00. Price Engineering, Box 1923, Wil-LaBrea Sta., Los Angeles 36, California.

STREAMLINES, Built-in kitchen cabinets to fit any kitchen. Complete, easy to understand detailed plans and specifications showing "professional" construction methods. All for $1.00. Thombert Co., Box 447A, Newton, Iowa.

NOW! Build Cuban Sugar Cane Cart 18½" x 8½". Holds fruit, flowers or plants. Ornamental, useful. Retail value when finished $6.96. It's easy to make. Complete instructions and working chart only 25c. Starr Productions, Dept. 55, 4117 N. Monitor, Chicago 34, Illinois.

SAVE Money. Build Record Player. Plans 50c. S & T Projects, Dept. B., Box 12, Hallowell, Maine.

LEARN by doing. Build "Speedy" motor. Instructive, enjoyable little project. Guaranteed satisfaction. You get—complete parts, wire, battery, illustrated instructions, plus, "How Motors Work" lesson. $1.00. J. Madden, 50 Granite St., Brooklyn 7, N. Y.

MAKE your own 14 pound Modulite concrete blocks. Build for less. How booklet 25c. Peerless, New Lenox 1, Illinois.

DIME brings generous sample assortment—new solid Aluminum Woodscrews, or Machine Screws, Bolts! Bright silvery finish! Rustless! Featherweight! Strong! Mail dime (11c Ohio) Hudson Industries, Hudson, Ohio.

KITCHEN Cabinet book. Complete plans, instructions eleven popular styles. How to plan modernized kitchen, build, install new cabinets at big saving. $1.50. Craftsman, 115-S Worth Street, New York 13.

94 WATCH REPAIRING

WATCHMAKERS' Journal. Helpful hints on watch repairing. Copy 15c. Dean Co., 116 Nassau St., New York 7, N. Y.

WATCH and clock repairing increasing, complete home study course with drawings and pictures. Information free. Houston Chronometer and Watch Co., P. O. Box 1140B Houston 12, Texas.

95 OLD GOLD, WATCHES, ETC.

CASH for Old, Broken Jewelry. Highest prices paid immediately. Mail gold teeth, watches, rings, silverware, diamonds, spectacles. Satisfaction guaranteed. Information free. Rose Smelting Co., 29-Y East Madison, Chicago.

WATCHES. Wholesale. Rebuilt Elgins, Walthams, Bulovas, etc., $9.75 up; new and used diamond, railroad, 21J wrist. Catalogue free. Brookins, B-1975Y, Little Rock, Ark.

GOLD immediate cash for gold teeth, watches, jewelry, diamonds. Modern refining assures highest prices. Free information. Dr. Herte's Gold Service, 165 N. 85th St., Milwaukee 13, Wisconsin.

96 JEWELRY

JEWELRY Findings. Lowest Prices. George Sassen 154 Nassau Street, New York 7.

CERAMIC Jewelry Supplies, Bar Pins, ear screws, for ceramic and woodworkers, also, glass and sea shell assemblers. Free catalog. Philadelphia Badge Co., 1007 Filbert St., Philadelphia, Pa. Dept. E-1.

SEMI-FINISHED Cowboy buckle sets, rings, etc., in silver, very clean. Send $1.00 for sample ring, state size. Will cast 1 or 10,000 items in gold or silver from your model or drawing. Free circular on request. Southwestern, Box 1399, El Paso, Texas.

MANUFACTURE costume jewelry at home for profit, hobby, therapy. Free wholesale supply catalogue. Instructions. Florida Supply House, Bradenton, Florida.

PRECIOUS, semiprecious stones, plastic-metal findings, list 10c refundable with first order. Pickwick Findings, Box 780-X, Stamford, Conn.

RHINESTONES — Moonstones — Pearls —Findings. Free literature. Herber, 1360-B Hicks, New York 67.

97 TOBACCO & PIPES

PIPE Carving kits 75c. Seconds $5.00 pipes 65c. Literature free. Carvapipe, 2829A Dixie, Hamilton, Ohio.

98 RAZOR BLADES, SHAVERS

100 DOUBLEDGE blades. Blue Steel. $1.00 P.P. Cerny, 5006 Dewey, St. Louis 16, Mo.

100 DOUBLEDGE $1.00. Best quality, tempered bluesteel. Satisfaction guaranteed. Send $1.00 to: Gotham Distributors, P. O. Box 114-C, New York 28, N. Y. Distributors Wanted.

100 MISCELLANEOUS

BOOKFINDERS! (Scarce, out-of-print, unusual books). Quickly supplied. Send wants. Clifton Company, Box 1377 PSM, Beverly Hills, Calif.

TOY Pistols, wholesale and retail. Circular free. C. C. Groff, 116 Broad St., Lancaster, Penna.

ALLURING pin-up girl close-ups in unretouched natural poses by professional female models. Sent in plain envelope. Six different wallet size—25c or six large 8 x 10 suitable for framing—$1.00. Box 862, East Pittsburgh, Pa.

HULL Automobile Compass, value $4.95, brand new, $2.50. Prisms for 6 x 30 or 8 x 30 binoculars, brand new, $1.50 each. Offset prisms to be attached to 7 x 50 B. & L. Binoculars, gives double the field of the ordinary 7 x 50 binocular. Cost $98.00, special $25.00. Green sunshades for binoculars, size 6 x 30 and 7 x 50, snap on type, value $7.50, special $1.25 per pair. Forward money order. No C.O.D. shipments. Send coin $1.50 for Third Annual Edition of Gun Digest together with our complete catalog of new and used guns, ammunition, rifles, binoculars and powder flasks. Our separate catalog 25c. Public Sports Shops, 11 S. 16th St., Philadelphia, Pa.

RECEIVE Giant mails, samples galore! Two year listing, $1.00. Nine months, 50c. Stanford, 6220-N 16th, Philadelphia 41, Pa.

MEN! Large size shoes, large size sox: We specialize in large sizes 10 to 16, widths AA-EEE. Oxfords, Hitops, Work shoes. Guaranteed extra quality. Free Catalog. Kingsize, 553 Brockton, Mass.

MAKE your own cosmetics, stain remover, remedies, insecticides. Real manufacturing formulas. Tested approved. $1.00. Afink Chemists, 4 Clark Place, N. Y. 52, N. Y.

ABACUS. Add with the abacus, world's oldest calculator. Now improved. Adds, subtracts, multiplies, divides lightning fast. Illustrated instructions show how. Send for Free lesson and details. Loy's Chinese Calculator, Dept. 84S, 1317 R.I. Ave., N.E., Washington 18, D. C.

U. S. SURPLUS clothing bargains. Free catalog. N. Y. Clothing Co., 2079B Second Ave., N. Y. 29.

APPLIANCE & building repairs. Own your own business. Free particulars. C. A. Griffith, 132 Water St., Fredonia, N. Y.

"SWAP That Tie." Send one to six ties you're tired of. You'll receive pronto same number beautifully cleaned different ties. Then pay postman $1.00. Shamrock (S) 3015 Woodslee Dr., Royal Oak, Michigan.

VALUABLE franchise available for Minneapolis Honeywell controlled oil burner for homes, theatres, stores, churches, etc. Only $85.00. Standard, Dept. 3, 21 Broad Street, Newark, N. J.

MIRACLE art fotos, instantly developed with plain water. 20 different $1.00. 4 samples 25c. Modern Products, P. O. Box 2, New York 2.

BRILLIANTLY-colored outdoor pictures 25c. 7—$1. Books sell out: 6—$1. View-Photo-Western Card Sale 200—$1. 500—$3. You'll be thrilled with any assortment. Mediator Lefferts, Box 121-S Brooklyn 25, N. Y.

Copyrighted material

PANNING Gold—Two instruction books 25c. Old Prospector, B-112, Dutch Flat, Calif.

MAIL your worn Saw for filing, setting—hand or circular to 10" diameter—returned including postage $1.00—retoothed $1.50—6 kitchen knives sharpened $1.00—anywhere U.S.A.-C. Crossley, 91 Pine Ave., Riverside, Illinois.

HYPNOTIZE! Control the minds and actions of others! Completely illustrated course $1.00. Money Back guarantee. Fowler, Box 1284, Boston 4, Mass.

SQUARE Dance calls. 25 sets. $1.00. Rayburn, Eureka Springs, Arkansas.

SHIRTS—Men's White Broadcloth Shirts. Sizes 14 to 17. All Sleeve lengths. Special $3.20 Postpaid. 3 for $9.50. E. Leiterstein, 1655 Macombs Road, New York 53, New York.

MANUFACTURERS names most any item made. $1.00 brings lists. H M G Company, Mecca, Indiana.

MAKE your own printing cuts. Newly invented plexiplate process. Plexiservice, Argyle 2, Wis.

MEN'S leather belts $5.00 dozen. Ladies' handbags $5.50, retails $12.50. Caspy, 239 Dumont Ave., Brooklyn 12, New York.

ART Photos! Sample 50c, 3 for $1.00. Post Office Box 2011, Phoenix, Arizona.

PRESERVE Baby Shoes Several Methods. Instructions. $1.00. Hohnson, 2611PS Harriet, Minneapolis 8, Minn.

GOVT. Surplus protective Hoods. For Fishing, Sports. 2 for $1.00 postpaid. "ME." 13750 Gart, Van Nuys, Calif.

ARMY Twenty U. S. Shoulder Patches $1.00. Springer's, El Paso, Texas.

LEAD and Zinc specimens mined in N.E. Oklahoma. Mounted attractively in 3" paper weights, completely illustrated. $1.00 postpaid. S and D, Box 46, North Miami, Okla.

BURGLAR Alarms any system, foolproof, easy to install. For home, store or factory $18.50 to $85.00. Electric, (invisible) up to 1,000 Ft., $18.50 to $300.00. Gas Station Alarms, $7.50 and up. J. & Jean Signal Co., 27 No. Grove St., East Orange, N. J.

101 FOR SALE—MISCELLANEOUS

NAVY Black work shoes, $6.95; Army perfect wool blankets, $3.95; Send for Catalog. Cleveland Army Surplus, 3810 15th Street, Kansas City 1, Mo.

WAR Surplus other bargains new—Gas Masks 25c. Huck Towels, work caps, waist belts, fatigue caps, work gloves 39c each. Baseball caps 59c, 79c, fishermen's caps 89c, leggings 59c, white, 98c, axe & sheath 98c. Pistol belts 69c, white $1.25, metal utility boxes 98c, oil lanterns $1.89, flashlights 69c, 79c, trench shovels and covers 98c, hunting knives & sheaths $1.49 & $1.98. Rubber knee boots $4.35. Navy T shirts 59c, work shoes $4.25, $4.45, $5.45 & $5.95. Air corps type sunglasses $2.45, sailor hats white, grey 55c, sweat shirts $1.69, dungarees sizes to 34, $2.15. Used Army Goods Good condition. Canteens 50c, covers 15c, cups 25c, mess kits 39c, musette bags 75c, knapsacks 75c, puptents $2.95 & $3.95. Hundreds of other items—write for circular, ship Railway Express or parcel post. Please include postage, any overage refunded. Money back guarantee. Imperial Outlet Co., 529 Nostrand Ave., Brooklyn 16, N. Y.

102 WANTED MISCELLANEOUS

MERCURY—Highest prices. Free Containers. Write Mercury Terminal, Norwood, Mass.

104 PERSONAL

HOW You can find out! Information discretly developed. Any matter, person, problem, anywhere. Personal-Business assignments, representations undertaken. Nationwide. Officially licensed, bonded service. Established 1922. Reasonable. Confidential. William Herman, 170 Broadway, New York.

RUPTURED? Positive comfort, no understraps, no steel, no elastic. Write Smith Manufacturing Co., Preston, Ontario.

CALIFORNIA on your mind? 1948-49 illustrated Fact Book. For employment Business opportunities, etc. 570 pages $2.00. Bartel, 647 Maltmen, Hollywood 26, Calif.

CREATIVE Psychology can change your world as you would wish to have it. New, different—get results. Thrilling details free. E. Jay Beacom, Box 177, New Brighton, Penna.

HAIR Falling? Dandruff? Write Trichologist, 139 Lewis Street, Phillipsburg, N. J.

BUY Vitamins Direct, Amazing Savings. Money Back Guarantee. Our 9th year! Postcard. Matoska Products, White Bear Lake, Minn.

BORROW by mail. Loans $50.00 to $300.00 to employed men and women. Easy, quick. Completely private, confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Write State Finance Co., 320 Securities Bldg., Dept. E-14, Des Moines 9, Iowa.

HELP for Hay Fever Sufferers. Money back guarantee. $1. Leona Stoewsand, Dept. A, Room 217, 301 E. Regent, Inglewood, California.

TIES Exchanged. Send eight ties and $1.00. Receive eight. Stahl's, Williamsport, Indiana.

ART, Scenic photos. Sample 35c, 4—$1.00. Color Slides 50c, 3—$1.00. Movies—Sample, Brochure 25c. Novelty, 1227 E. Van Buren, Phoenix, Arizona.

SWAP Ties. Mail us one to six ties you're tired of and one dollar. Receive in return same number of different ties all beautifully cleaned. Tie X-Change, Dept. B, Box 1036 G.P.O., New York City, New York.

ALL Types—Write for free catalog. Engineered Products Company, Sandusky, Ohio.

MAIL Forwarding Service, 25c per letter. Box 534, Tallahassee, Florida.

MEMO—Science 35 cents. Fastest, Cheapest Study Method. Languages, Arithmetic, etc. Guaranteed. Sylvester Berg, Box 3231, St. Louis 10, Mo.

MAIL Forwarded from Reno, Nevada. 25c each. P. O. Box 705, Sparks, Nevada.

SWAP Neckties. Fed up with yours? Trade 'em! Mail us six and receive six freshly cleaned, different ties. Send $1.00 or pay postman. Tie-X-Change, Box 733, Cleveland, Ohio.

INFORMATION for single people by Human Relations Consultant. University Graduate. Dr. B. Long, Box 375, Los Angeles 53, Calif.

MEXICAN Law General practice Attorney. 1203 Arizona Street, El Paso, Texas.

"SPIRITS of Spiritism Identified." 15c Bulletin. Box 87, Cathedral Station, New York 25.

MORE and better hair for you. All about latest secrets, discoveries. Write immediately. Bruns, 3307-E Fremont, Madison 4, Wisc.

TRADE neckties! Send us six used neckties and $1.00. You'll receive six handsomely cleaned different ones. M. Kenny, Lock Box 8161, Chicago, Ill.

HOLLYWOOD postmark. Letters remailed. 25c each. Dee, P. O. Box 17, North Hollywood, Calif.

SURPRISE your friends! Pretend you're in California. Letters remailed. 25c each. Eddie Rust, 597 S. Thomas, Pomona, Calif.

LEARN Amazing Hypnotic powers. Secret instructions. 50c. Lerner, Box 28, Bronx 67, N. Y.

105 ADVICE

RUPTURE cured in 1 month, natural invention, no buying, inquire. Picus, Redwing, Providence, R. I.

106 ADVERTISING

ADVERTISING Sensation! Reach 2,100,000 families. $32.90 inch. Display, classified, ratebook (newspapers, magazines, mailing lists), advertising assistance, free. Chicago Advertising Agency, 20-PS, West Jackson, Chicago 4.

ADVERTISING: Place in any publication, anywhere. Write for mail-order rate sheet "S". LeGrand Advertising Agency. (Established 1923). Floral Park, N. Y.

24 WORDS in 64 Weeklies $4.96. J. Darnell, 730 Hays, Jackson, Tenn.

ADVERTISING art and photo-engraving. Dependable, quality service. Send rough layout or description for estimate on art cuts. Conway Engravers, Conway, S. C.

ADVERTISE: 24 words, 40 Newspapers $3.50. List Free. Advertising Bureau, 229 P Dixon, Uniontown, Penna.

114 DRAFTING INSTRUMENTS

SAVE on drafting materials. Free catalog. Draftsmen's Supply Co., 32 North Wells, Chicago 6.

117 TATTOOING SUPPLIES

TATTOOING Outfits, Supplies, Illustrated List Free. Zeiss, S-484 Lesley, Rockford, Illinois.

120 CANDY MAKING

MEN-Women—"Most Everybody Likes Candy." Learn to make delicious confections the Ragsdale Way. (Our 38th year.) Ragsdale Candies, D2, East Orange, N. J.

125 WOODS

BUSINESS cards of real wood. Write Cards of Wood, Manlius 2, N. Y.

129 MAGNETS

ALNICO Magnet—Lifts Ten Pounds! $1.00. Catalog 3c. Ronald Eyrich, Box 849, Milwaukee 1.

ALNICO magnets. Free list. Terry Sales Company, 3726 South Detroit Av., Toledo 9, Ohio.

131 TREASURE FINDERS

METAL Detectors. The Very Latest Circuit. Free Literature. Hedden Metal Detectors, 538 North Homewood Avenue, Pittsburgh 8, Penna.

TREASURE Hunters! Radically new Goldak locators. New featherweight Model 101 weighs only 11 pounds! Revolutionizes location of Gold, Silver and Minerals. Money-back guaranteed superior any other. Write The Goldak Co., 1544 W. Glenoaks, Glendale 1, Calif.

SEEK Buried treasure; Methods, mysteries, devices explained. Circulars free. Century Press, Box 151-D, Glen Ellyn, Ill.

M-SCOPE Metal Locator fully guaranteed and unsurpassed in efficiency. New featherweight models. Time payment plan. Free literature. Fisher Research Laboratory, Inc., Palo Alto, Calif.

137 DETECTIVES

DETECTIVE Training. Phillips Secret Service, 1917C, N. Kenneth, Chicago 39, Ill.

DETECTIVES—Work home—Travel, Experience unnecessary. Write Wagoner P-125 West 86th, N. Y., N. Y.

142 INFORMATION

MEN-Women—"Most Everybody Likes Candy." Learn to make delicious confections the Ragsdale Way. (Our 38th year). Ragsdale Candies, D7, East Orange, N. J.

QUESTIONS? 25c brings full information of our "Information Service." C. A. Gray, Inc., Dept. 'A,' 418 Broad Street, Syracuse 10, N. Y.

INFORMATION, any subject about Houston, Texas. $1.00 M.O. with request. Reliable, Dept. PS-1, 1052-N, Houston 11, Texas.

143 NAME LISTS

MAILING lists; most classes, 1000 $5.00. Free Prospectus. Dixie Service, King, N. C.

SOUTH America! List of 125 companies with foreign interests: $1.00 or C.O.D. Foreign Service Institute, Box 3934 K Miami 24, Fla.

144 MILITARY INSIGNIA

FREE—3 Military Emblems, with Catalog 10c. Hobbyguild, X35 West 32, N. Y.

Copyrighted material

GROBAN'S SURPLUS BARGAINS!

BRAND NEW

AIR OR OIL HYDRAULICS

Use hydraulics on arbor presses, hydraulic presses, hay lifts, manure loaders, lift trucks—push or pull, tilt or turn, press or squeeze, open or close, lift or lower—and other hydraulic and industrial applications. Use with either air or oil . . . of finest precision workmanship.

1. Double action, 3" bore, 12" stroke. All steel hydraulic cylinder, will lift up to 12,000 lbs. (7000 lbs. in 3 seconds with Vickers Pump). $78.00 value. Wt. 12 lbs. . . . . **$19.50** postpaid.

2. Double action, 1½" bore, 27" stroke. (Will lift 1760 lbs. in 2 seconds with Vickers Pump). Wt. 8 lbs. A $55.00 hydraulic cylinder value **for only** . . . . . **$12.95** postpaid

3. Double action, 2⅜" bore, 8" stroke. (Will lift 4400 lbs. in one second with Vickers Pump). Will withstand 1500 P.S.I. against wall. A $65.00 value, available now at **$14.50** postpaid.

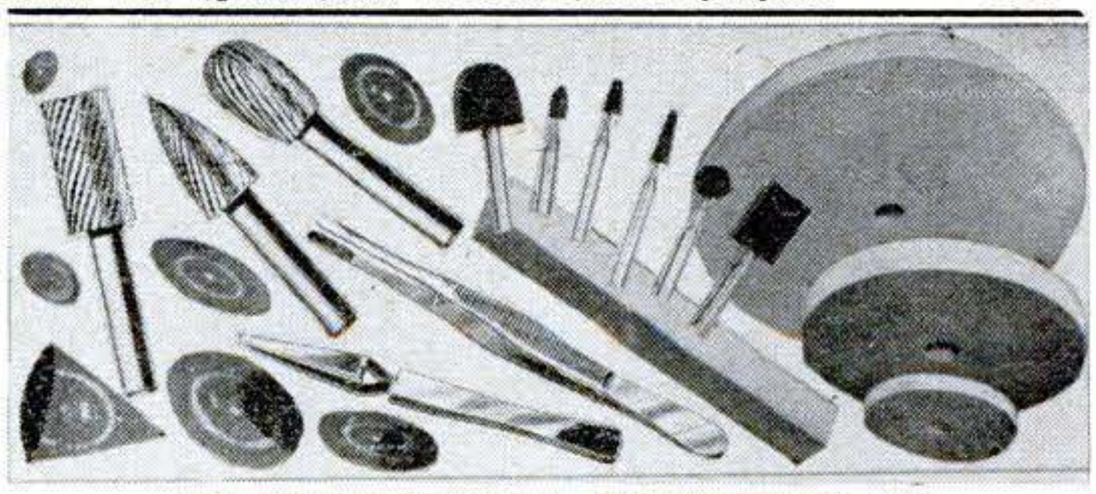
BRAND NEW

HYDRAULIC CONTROL VALVES

With built-in relief valve. Use them manually or automatically for single or double action cylinders. Inlet port 9/16", outlet port ¾", cylinder port ¾". Complete with ILLUSTRATED instruction sheet. 6"x3½"x3¼". **$5.95** postpaid.

VICKERS MF6 HYDRAULIC PUMP or MOTOR

Compact, powerful, rated 1,000 P.S.I., 507 cu. in. per revolution, 8 gal. per min. at 3750 r.p.m. Change rotation by reversing flow. Delivers up to 6 H.P. BRAND NEW. Wt. 4½ lbs. $60.00 value for **$14.95** postpaid.



GRINDING WHEELS

Actually Worth $50.00

A wonderful buy! 350 pieces incl. 35 ass't. Grinding and Cut-off wheels up to 10 inches diameter. 1/16 to 1¼" face, ⅛ to 3 in. holes. Ass't. grits—all brand new—Made by Norton, Carborundum, Macklin, Bay State, etc. Also included are 100 slotted disc cloths; 100 paper discs; 10 pencil rolls; 20 abrasive strips; 2 felt bobs; 2 felt wheels; 1 4" rag buff; 3 honing stones; 10 abrasive sleeves; 10 mounted stones, ⅛ and ¼" shank; 2 mandrels; 2 rotary files, ¼" shank; 50 abrasive discs; 2 72" abrasive belts; 5 9x11 abrasive sheets. **Satisfaction Guaranteed. 350 Pieces—Ass't. sizes FOB Chicago—All for Only** **$6.95**

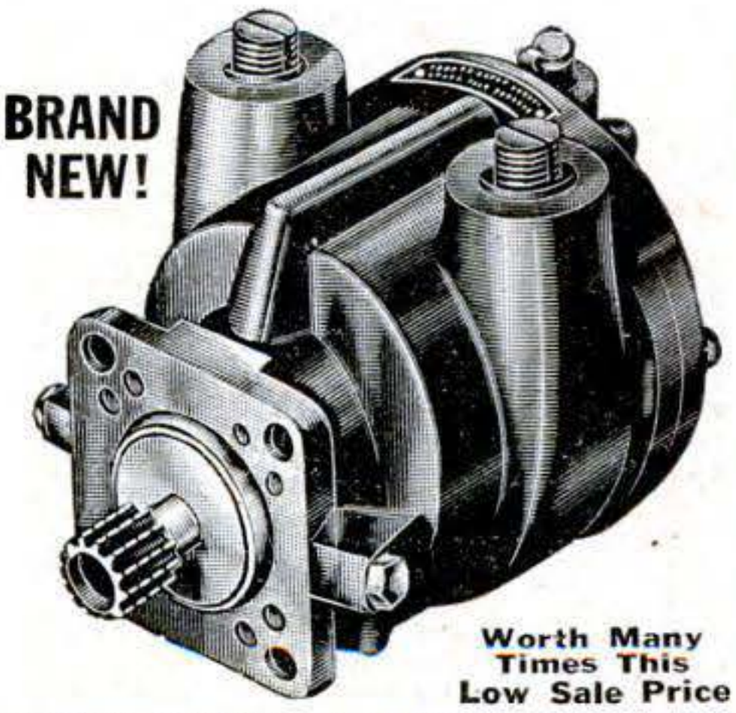
VACUUM-AIR HYDRAULIC

GENERAL PURPOSE PUMP

Original Cost $45.00 Now Only $9.95 Prepaid in U. S. A.

Use them for
OIL BURNERS
SPRAYING MACHINES
MILKING MACHINES
COMPRESSORS
VACUUM PUMPS
HYDRAULIC SYSTEMS
MANURE LOADERS
PRESSES, etc.

BRAND NEW!



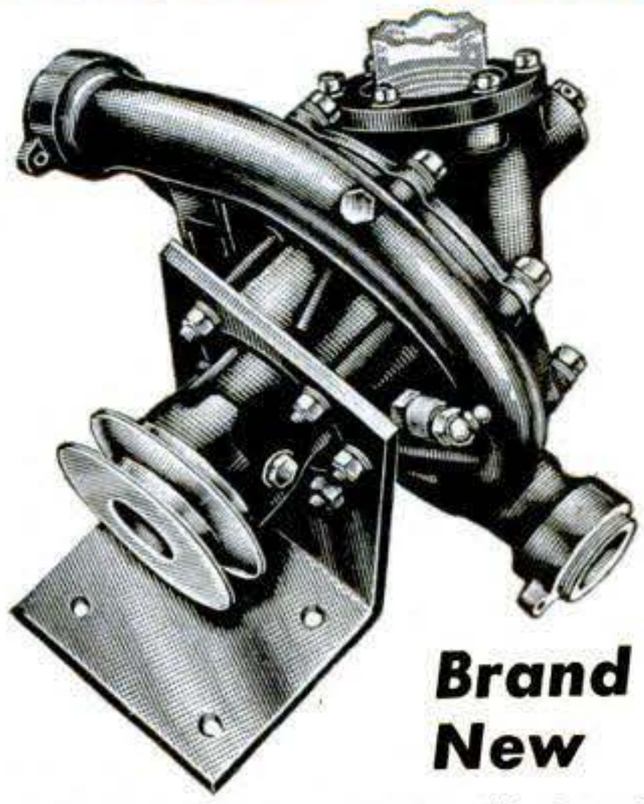
Worth Many Times This Low Sale Price

• Originally cost $45.00. May be used as air or fluid pump—for pressure or vacuum. Standard ⅜ inch pipe thread with interchangeable ports. Will pump 7½ gal. SAE 30 oil per minute at 300 RPM. Builds air pressure of 30 lbs. per sq. in. at 1000 RPM. Vacuum will draw 26 inches of mercury at 1750 RPM. Develops up to 120 lbs. per sq. inch of hydraulic pressure, which in conjunction with a 3 inch hydraulic cylinder will lift 840 lbs. minimum. Runs forward or reverse. Self aligning shaft. Die cast aluminum housing 6x4x4 inches. Has stainless alloy steel vanes and impeller. Made by Bendix Avia. Corp. Spline terminal for direct drive—readily replaced with a pulley. Recommend a ¼ H.P. or stronger electric motor. Rated capacity 1500 RPM with high overload factor. Special price for quantity users. Complete illustrated engineering report and instruction booklet FREE with every pump. Send check or money order today! Postpaid in U.S.A. **$9.95**

CENTRIFUGAL PUMP

Belt Driven

Ready for use on any Liquid Pumping Need



Brand New

Use it for DRAINING BASEMENTS • HOME WATER SYSTEMS • IRRIGATION • STOCK WATERING • FIRE PROTECTION • DRAINING PONDS, TANKS, etc. • INDUSTRIAL PUMPING

Complete with Pulley and Mounting Bracket — Ready for Use

$29.75

F. O. B. Chicago

A super value for all types of intermittent service in pumping large volumes of liquid in home, farm and industrial service. Ideal for home water systems, draining basements, fire protection, etc. On the farm for watering stock, draining ponds, sprinkling, etc. In shops and factories for all types of pumping service.

MOVE LARGE VOLUME QUICKLY

When operated at 1750 RPM, will pump 42 gallons per minute on a 23 foot head; at 3600 RPM on 52 foot head will pump 88 gallons per minute. May be run with electric motor, gas engine or power take-off on tractor.

COMPLETE ENGINEERING REPORTS AND OPERATING INSTRUCTIONS FREE WITH PUMP

Pump has cast aluminum housing—accurately machined bronze impeller vanes. Complete with mounting bracket and 3½" V belt pulley. Shaft rotates on sealed ball bearings with grease gun fitting. Has 1½" threaded intake flange, two 1 inch outlets. Use one or both, as necessary. Made for Packard Motor Car Co. for use in Rolls-Royce Merlin Aircraft engines.

GREATEST PUMP VALUE IN YEARS

Original cost approx. $147.00. Sold F.O.B. Chicago. Shipping weight 23 lbs. You can't beat this value at anywhere near this price. Satisfaction guaranteed. **Original Cost Approx. $147.00.**

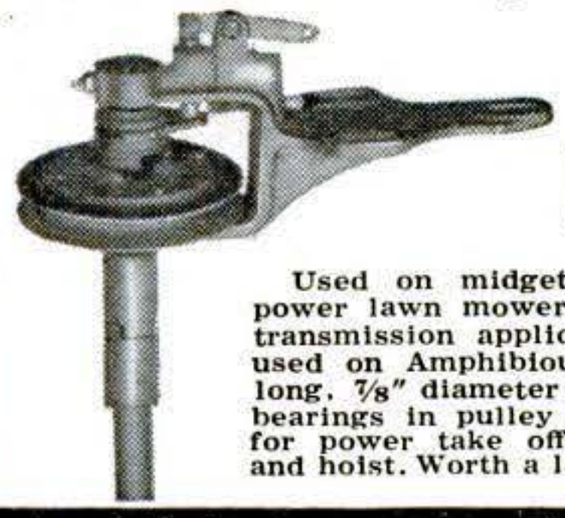
U. S. SURPLUS BARGAIN

Polaroid GoggleKit

Use them for all outdoor sports, beach, motoring, boating—anything.

Brand New! In original packing. Each with four interchangeable lenses. Shock Proof Frame. Shatterproof Lenses.

Heavy windproof sponge rubber ventilated frame with snap button lens retainers! Adj. elastic head band. Clear, red, green, amber, flexible, shatterproof lens, all instantly interchangeable, with carrying case. They won't last long at this price—it's smart to buy an extra. **$1.00** Prepaid in U.S.A.



CLUTCH with UNIVERSAL JOINT

Used on midget auto racers, garden tractors, power lawn mowers, small boats and other power transmission applications. BRAND NEW. Formerly used on Amphibious Jeeps. Has steel shaft 3 ft. long, ⅞" diameter and 5 inch pulley . . . with ball bearings in pulley can be used for power take off with winch and hoist. Worth a lot more. only **$4.95** F.O.B. Chicago

GROBAN SUPPLY CO. DEPT. P S-5, 1507 S. MICHIGAN AVE., CHICAGO 5, ILL.

Copyrighted material

An entire season of baseball action—from Opening Day to World Series—is yours with RCA Victor television.

You're right in the game—with Television

Comes the shout "Play Ball!" and there you are—on top of every play.

Through television developments in RCA Laboratories, all the action is yours—the crack of bat against ball—every step of fast infield plays—even sidelights in bull pen, dugout, grandstand and bleachers.

At the ball park, RCA Image Orthicon television cameras—rivalling the human eye in sensitivity of "vision"—get all the action in day or night games. Shifts from over-all views of the field, to "close-ups," are swift and revealing . . .

And at the *receiving end*—your RCA Victor "Eye Witness" home television set gives you brighter, clearer pictures. You can see the ball that the batter misses, or you can watch his home-run sail over the fence.

Today, because of the original and continuing work of RCA scientists, millions can enjoy sports, entertainment, educational and news events, on television. Research at RCA Laboratories—always a "step ahead"—enters every instrument marked RCA or RCA Victor.

When in Radio City, New York, be sure to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. Radio Corporation of America, RCA Building, Radio City, N.Y. 20.

RADIO CORPORATION of AMERICA

Copyrighted material

This Shipping Clerk Is Scientific

THE man with the funny-looking yardstick is Melvin Brockman, cargo specialist with United Airlines. The yardstick is the "cube stick" he invented to speed up measurement of the cubic content of packages, on which rates are based. This mathematical yardstick is scaled in logarithms.

Maybe you don't know what logarithms are or how they work. You can find out about these tools of mathematics in any public library. The point is that you don't need to know any more about them than the shipping clerk who is taking down the readings. Like so many scientific tools, they can be used without being completely understood.

Sure, it doesn't take a genius to multiply nice even dimensions to get cubic content. But if the measurements of a box are 38″ by 42″ by 47″, you will probably need pencil and paper. You will have to perform twelve individual multiplication operations and nine additions.

Using the logarithmic cube stick, with four-place figures, you need perform only five operations in addition. Even if you have to struggle with the primitive mathematics of a bank statement, you know it is easier to *add* three five-figure numbers than to *multiply* three two-figure numbers.

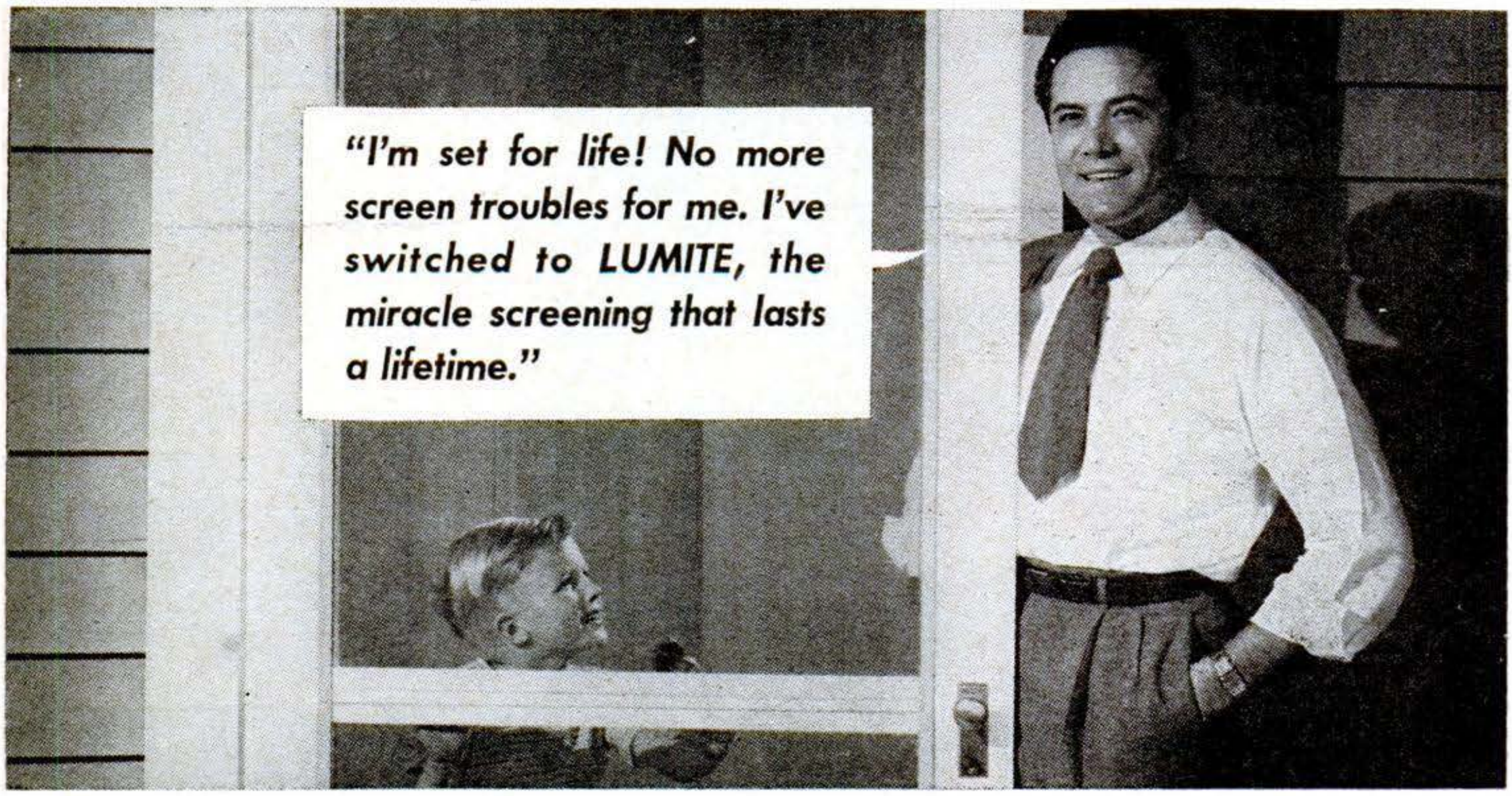
United Air Lines expects this cube stick to catch "tens of thousands of dollars of lost revenue"—a big saving from a little scientific gadget.

Perry Gilkeys

Copyrighted material

NOT IN 100 YEARS

Will this screening ever rust, corrode or stain your house !



This spring get this amazing new screening that's sweeping the country

Incredible, but true, LUMITE screening will NEVER rust, NEVER corrode, NEVER stain your house! Laboratory tests . . . and actual use in homes throughout the country have proved that LUMITE will not change in any weather or climate!

Woven of saran's tough, resilient plastic fibres, LUMITE is virtually indestructible. It never needs painting . . . always stays taut and firm . . . protects the beauty of your house. This amazing new kind of screen is in stock *today* at your Hardware, Lumber, or Building Supply Dealer. If you need screens for any part of your house this spring, be sure to order your supply of LUMITE now!

*®

For further information and free sample
write Dept. 43, Lumite Division
Chicopee Manufacturing Corporation
47 Worth Street, New York 13, N. Y.

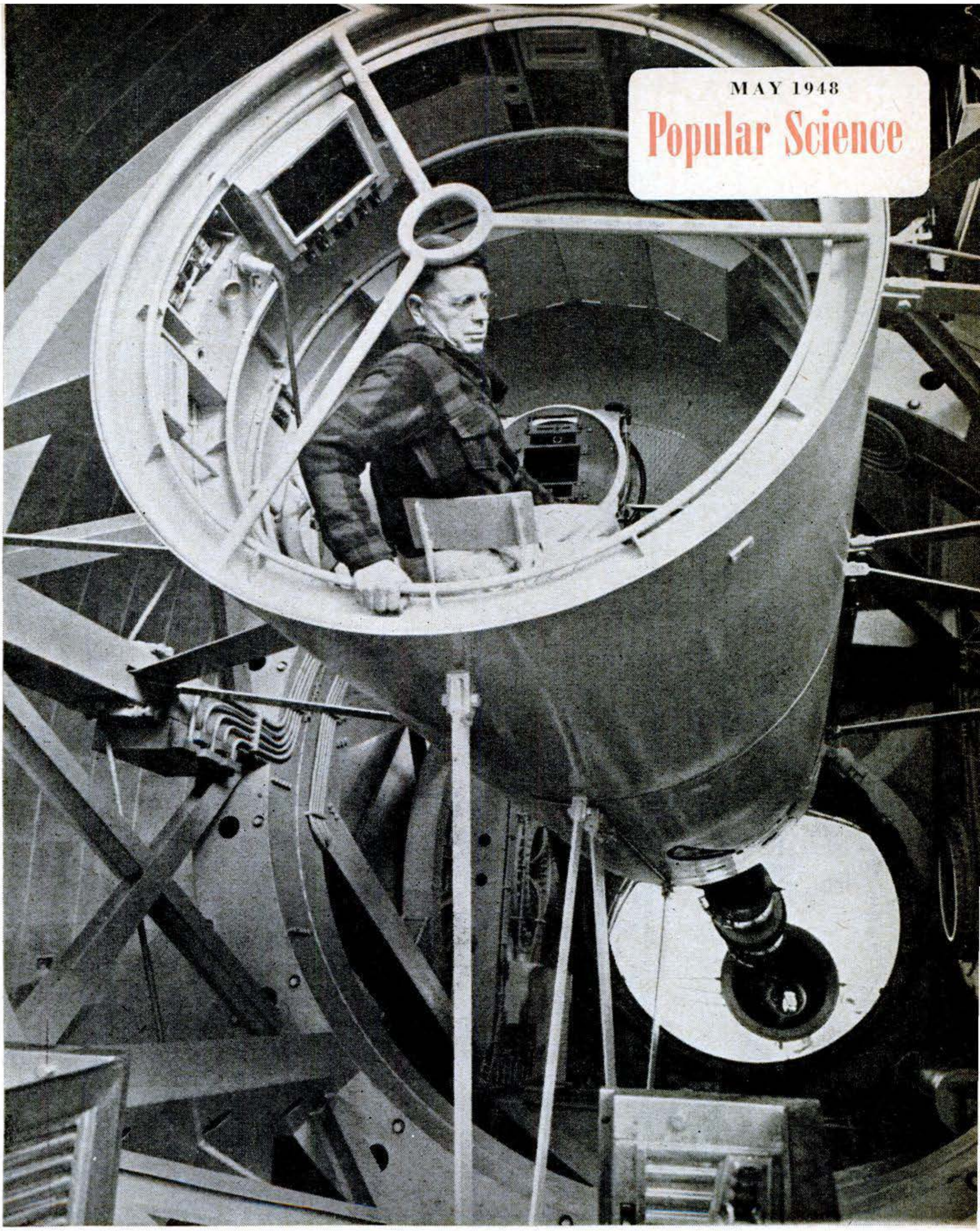
Screen once and for all with

LUMITE*

REPLACEMENT OR REFUND OF MONEY
Guaranteed by Good Housekeeping
IF NOT AS ADVERTISED THEREIN

Woven of saran

Copyrighted material



Outward Bound... From this six-foot-diameter observer's cage, hanging in mid-air at the most starward point of Palomar's giant telescope, modern stargazers will soon be probing the mysteries of outer space a billion light years away. Far below, the 200-inch, 15-ton mirror turns its shimmering face skyward, snugly in place after years of preparation. It will reflect its collected starlight up through a small hole in the cage bottom. From this "prime focus," observers will direct the sighting of the big spyglass by telephoning operators below. Then they will slip a photographic plate in place, and the whole telescope will become a gigantic camera tracking across space.

Copyrighted material

Unmanned research balloon soars upward, dangling its 70-lb. payload of weather instruments on line from open ring at bottom. Here, soon after launching, gas fills only tip of bag. As it rises, gas expands until at 100,000 feet it fills the entire balloon.

Are Secret Balloons the

The saucers could be sun reflections on low clouds, or they could be flattened hailstones, gliding down toward the earth.

Then the saucers could be Army weather radiosonde balloons, fitted with radar reflectors.

• • •

An Australian teacher showed his students that with prolonged gazing red corpuscles passed in front of the retina of the eye. As a result they "saw" objects in the sky.

One sure-fire flying saucer that fell to the earth in New Mexico turned out to be a weather balloon. Another, near New York, was just a cluster of balloons carrying cosmic ray equipment.

Copyrighted material

Twenty miles above the earth, the U. S. Navy is hanging its laboratories in space. Balloons that swell to 77 times their starting size provide the floating platforms.

New Balloons Explore Roof of the Airways

By Devon Francis

LITTLE FALLS, Minn.—In the brilliant Minnesota sky floats a pin point of light. To the unpracticed eye, it is only a meaningless white speck against the midday firmament. But to a cluster of men tracking its course by radio direction finder, radar, and theodolite, it represents the culmination of half a century of effort to throw light on some of this planet's darkest mysteries.

Such pin points, think the men who track them, may be the innocent source of the "flying saucer" stories. Actually, the one we are watching is an unmanned balloon, 100,000 feet above the earth. Never before has anything but a rocket gone that high. When the balloon was launched a little more than an hour ago, its helium content made a semi-transparent bubble only 17 feet in diameter. Now, almost 20 miles above us, it has expanded to a great 100-foot-tall envelope measuring 70 feet in diameter.

Expansion did that. At 100,000 feet the air is only 1 100 as dense as it is at sea level. The helium is pushing, seeking release, despite a temperature so low that if a man were exposed to it he would die within a minute. Though the sun is at its zenith, the balloon floats in darkness under a can-

Flying Saucers?

One educational authority suggested that seeing flying saucers was merely a case of the "meteorological jitters."

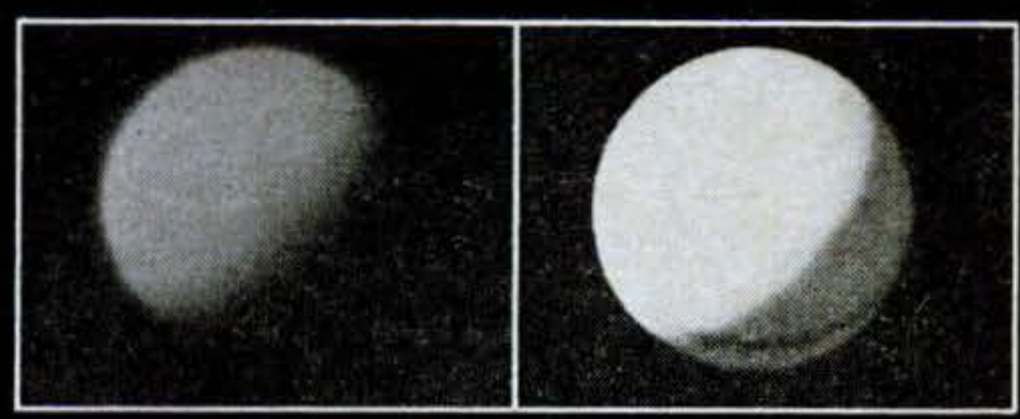
Another, that they *were* meteors.

• • •

Still another explanation: speeding airplanes churn up the atmosphere and cause distortion of light rays. The resulting phenomena could be electrical in nature, causing something like smoke rings in the sky.

• • •

A not implausible explanation was based on the high reflective qualities of glass. Why couldn't the saucers be sunlight reflected by plane windows?



At left above is a pretty convincing picture of a flying saucer.

It was created by Popular Science photographers in their own studio. By altering lighting on table-tennis ball at right, above, they simulated natural light on high-altitude balloon for effect at left.

• • •

And that's how your eyes can deceive you. Your guess is as good as the next.

Copyrighted material

Helium is piped through thin, extruded-plastic tube to form 17-foot bubble. Tapelike line stretching toward truck is rest of balloon envelope. Helium-bottle dolly is at rear of truck.

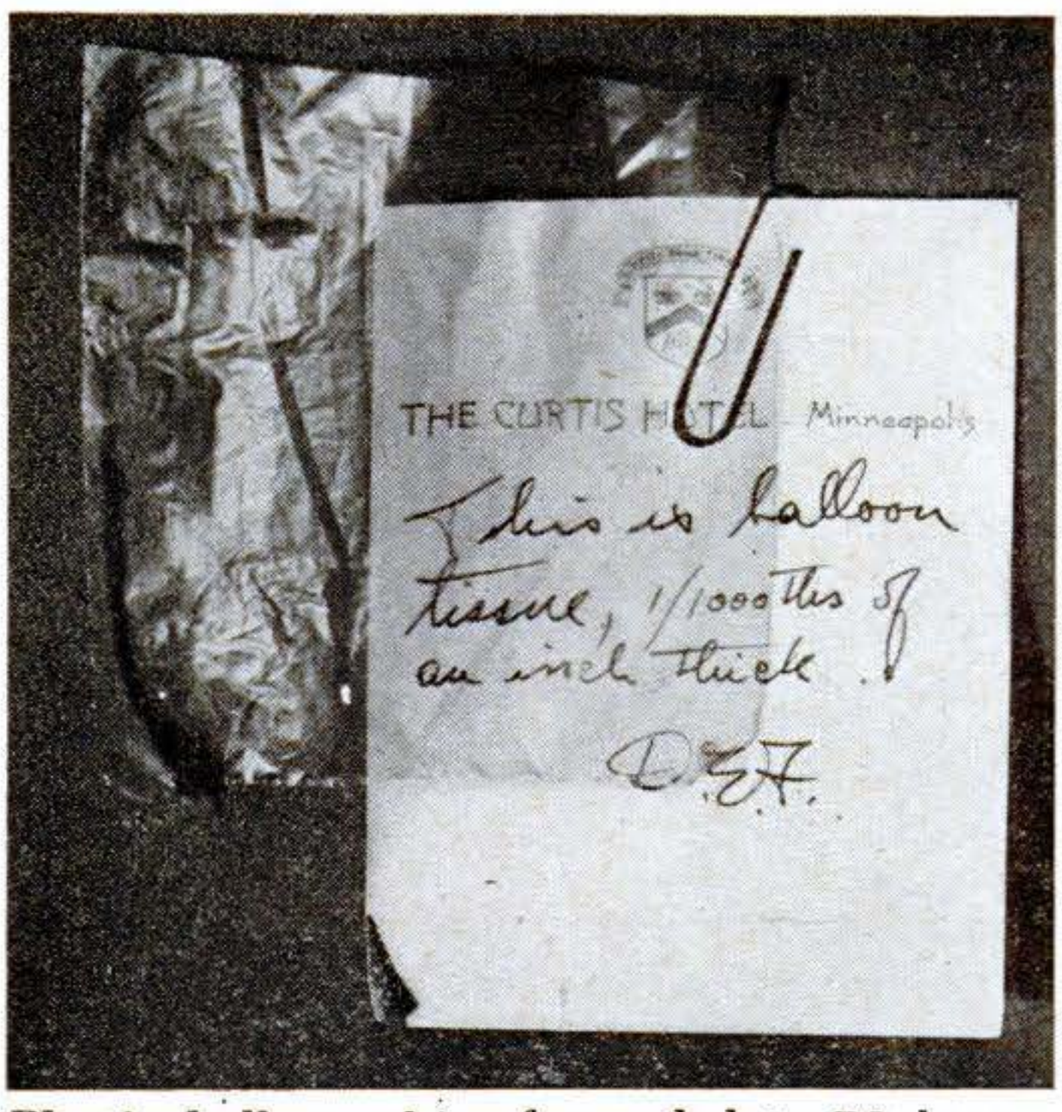
opy of stars, for the darkness at its altitude is eternal.

From a harness at its open end dangles a long load line, and to the line are attached a limp parachute and a string of instruments. These instruments are all-important —the balloon is only the vehicle used to deliver them to the altitude that scientists want to explore.

Yet the balloon is the focal point of observation from the ground. That is because the answers to the questions asked by chemists, physicists, and others depend on its behavior. Presently an electric charge timed by a tiny motor will melt a bit of wire, a razor-edged knife will sever the load line above the parachute, and the instruments will start their long journey to the ground.

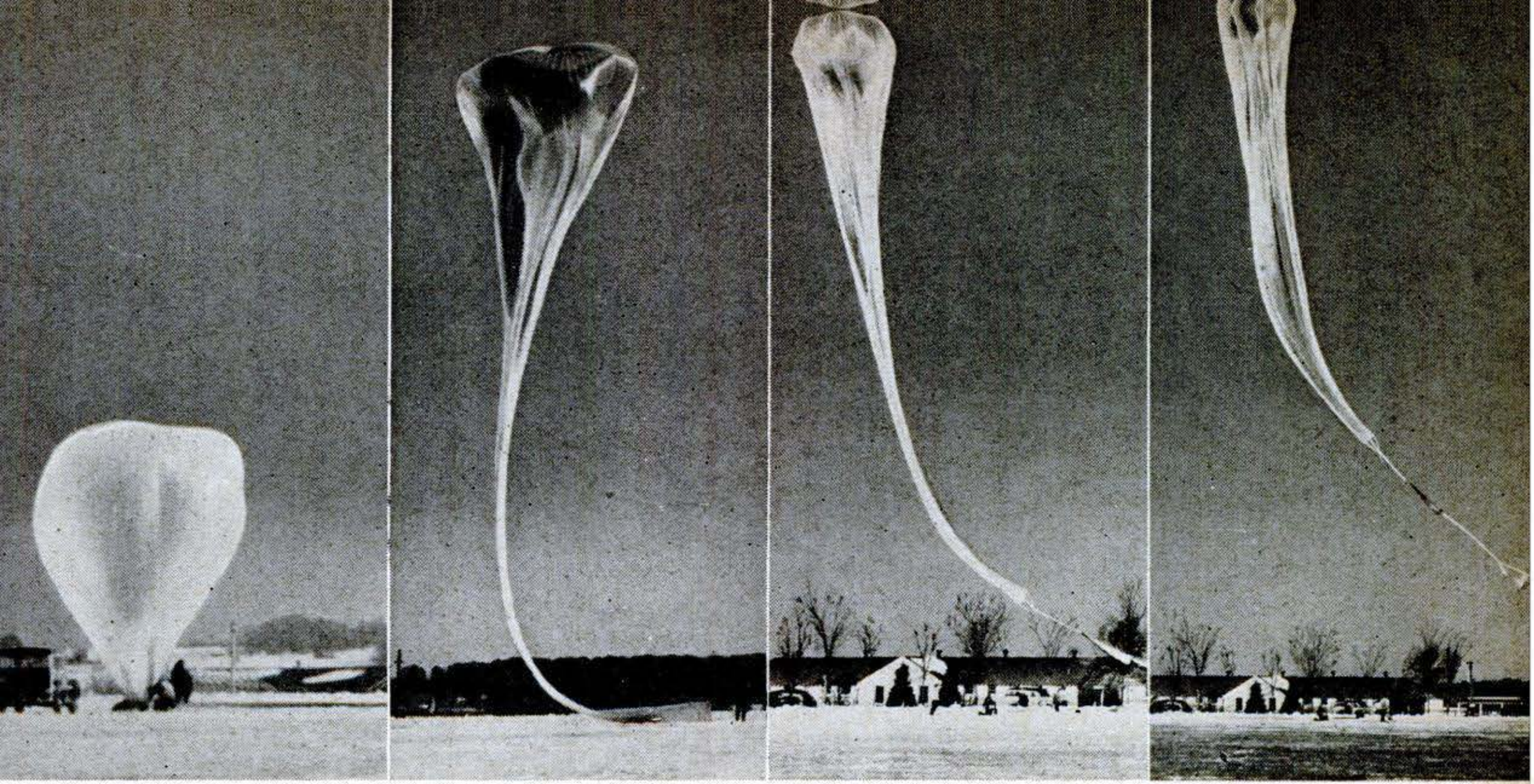
This is Project Skyhook. No explorations initiated in this postwar period are more pregnant with meaning for the future than this one, carried out by General Mills, Inc.,

Flow of helium from steel bottles into manifold, for piping to balloon envelope, is adjusted by technician. At start, only 1.3 percent of the balloon's capacity is filled by the gas.



Plastic balloon skin, forwarded to PS by reporter Francis, is polyethylene. It absorbs few infrared rays, and is unaffected by ultraviolet light, unlike some plastics, or by temperature.

Copyrighted material



At launching, helium bubble sails up, picking up load line. Apparatus weighing up to 70 lb. can be attached to it. Dark line seen in the final picture, far right, is the parachute.

of Minneapolis, for the United States Navy.

"Where our balloons now float," explained Otto C. Winzen, "will be man's highway of tomorrow." He is the young engineer who started the project and brought it to fruition for the Aeronautical Research Laboratories of General Mills.

Those balloons are probing a region that as yet is almost wholly unknown. A few conditions up there have been discovered. It is bitter cold—yet the sun's rays burn with fury far beyond that met anywhere on earth. Gravitational pull is practically unchanged. Winds often exceed 100 m.p.h.

But what about the composition of the air? The effect of cosmic rays on man and atomic structures? The speed of sound? What conditions will pilots encounter if wars are fought at that altitude?

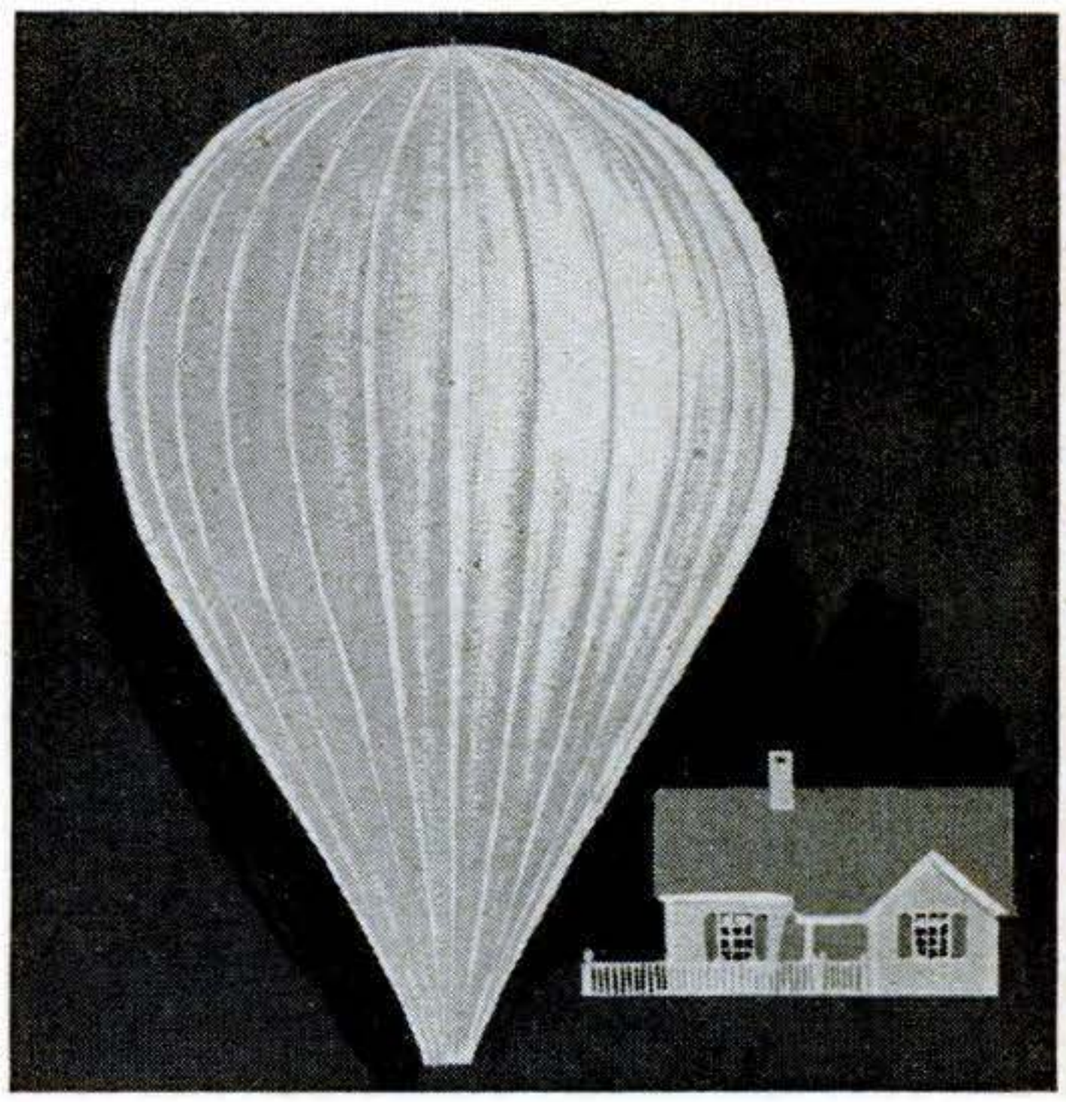
Airplanes can't supply the answers. They can't get much more than half that high. Small rubber sounding balloons reach only the lower levels of the atmosphere. The record for manned balloons is only 72,395 feet. Rockets streaking up and down through this layer of the atmosphere go too fast to take adequate observations.

What is needed is an instrument platform that is relatively stable and motionless in relation to the air—one that will reach and hold a precalculated ceiling of around 20 miles for hours or even days.

Hence, a new kind of balloon. No balloon ever made before is like those of the Aeronautical Research Laboratories. Their skin is tissue-thin. Yet these balloons carry a "payload" of 7/10 of their empty weight.

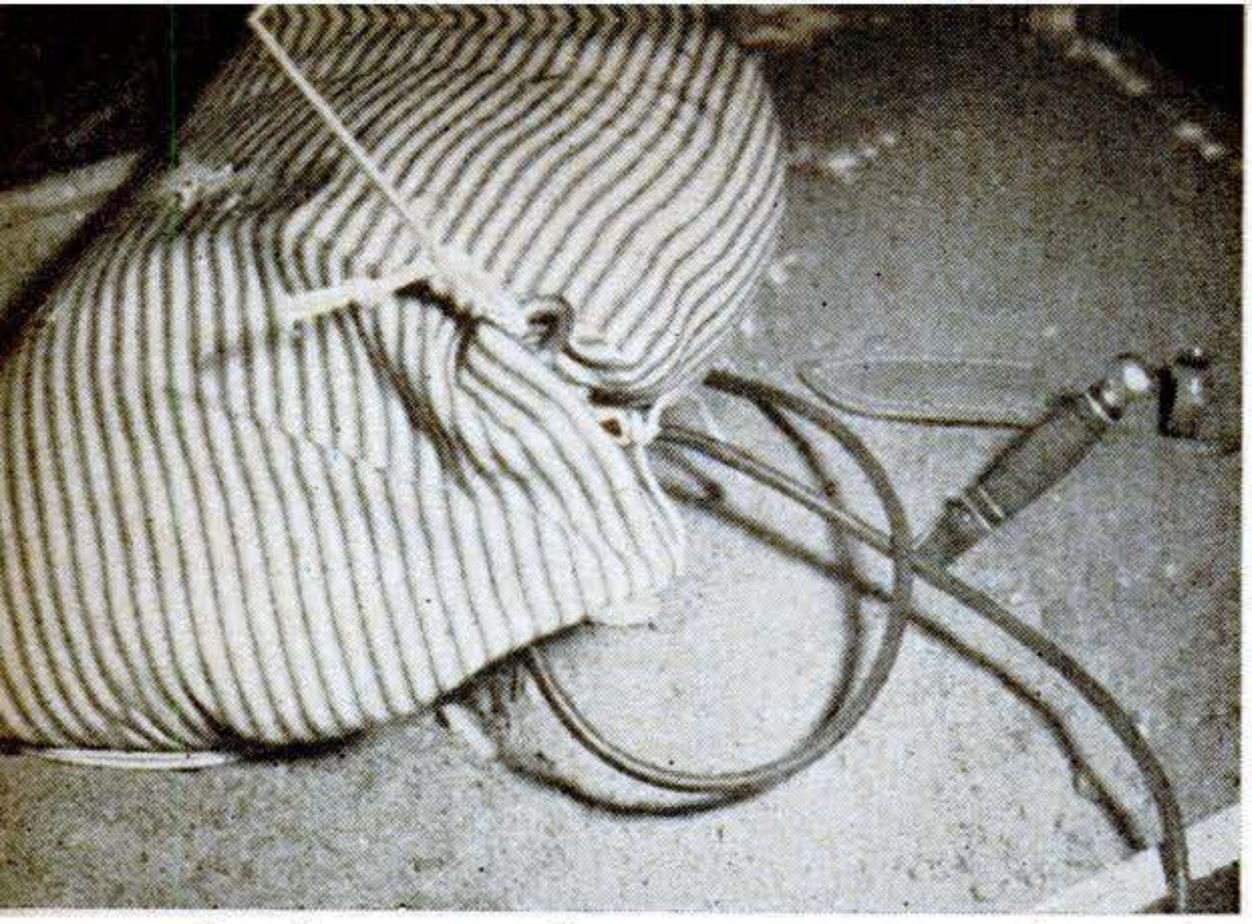
Science's secret weapon in this assault on the unknown is a plastic, polyethylene resin. Made by the Visking Corp., of Terre Haute, Ind., it weighs so little that one strong man can lift a whole deflated balloon.

Radiosondes, parachutes, tiny radio transmitting stations, radar reflectors, cosmic ray counters, special telemetering equipment, and other devices, about which the govern-

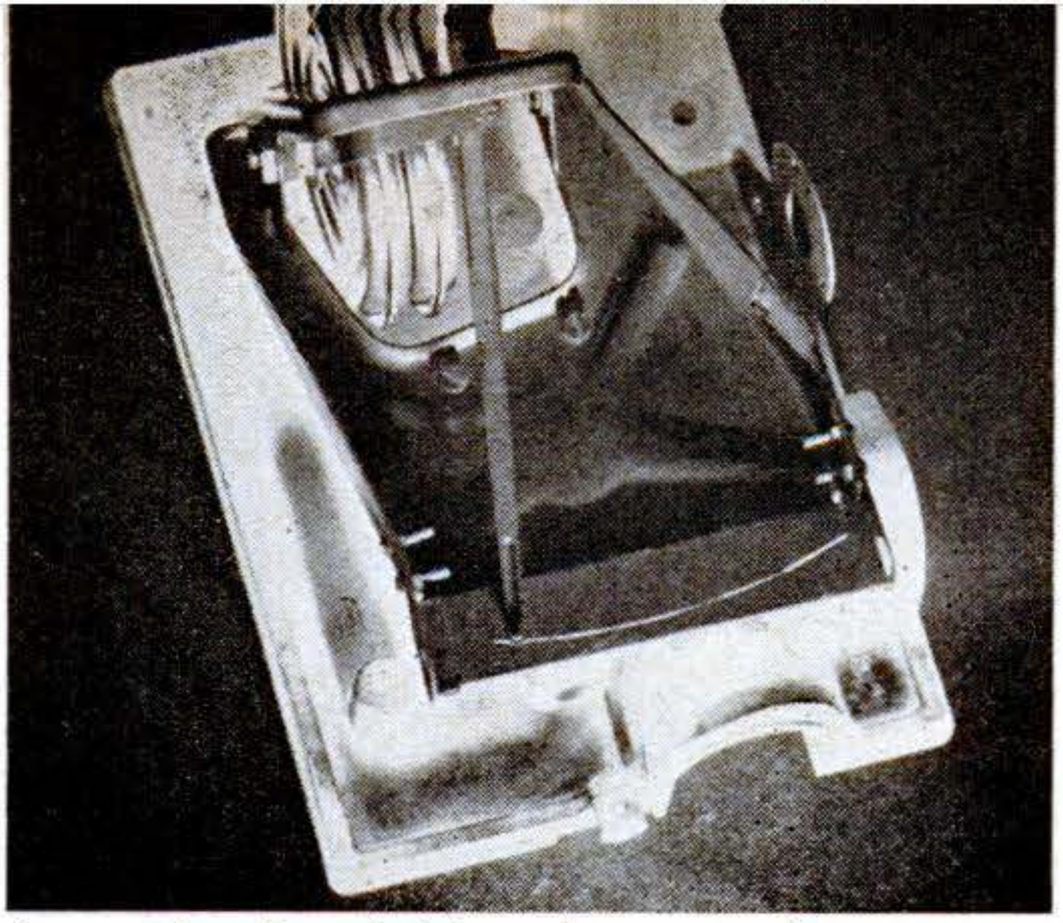


Full 206,000-cubic-foot capacity of bag, when it has swollen to the size of several houses, is reached at 100,000 feet or so. If winds are high, bag may be blown out of sight in an hour.

Copyrighted material



Sandbag at anchor conceals secret device for cutting anchor line electrically at launching. Knife is used in emergency. Balloon will rise above normal airplane traffic in 12 minutes.



Aneroid cell—reliable only up to about 60,000 feet—uses air pressure to run this instrument that records altitude. During climb, stylus etches line on glass coated with lamp black.

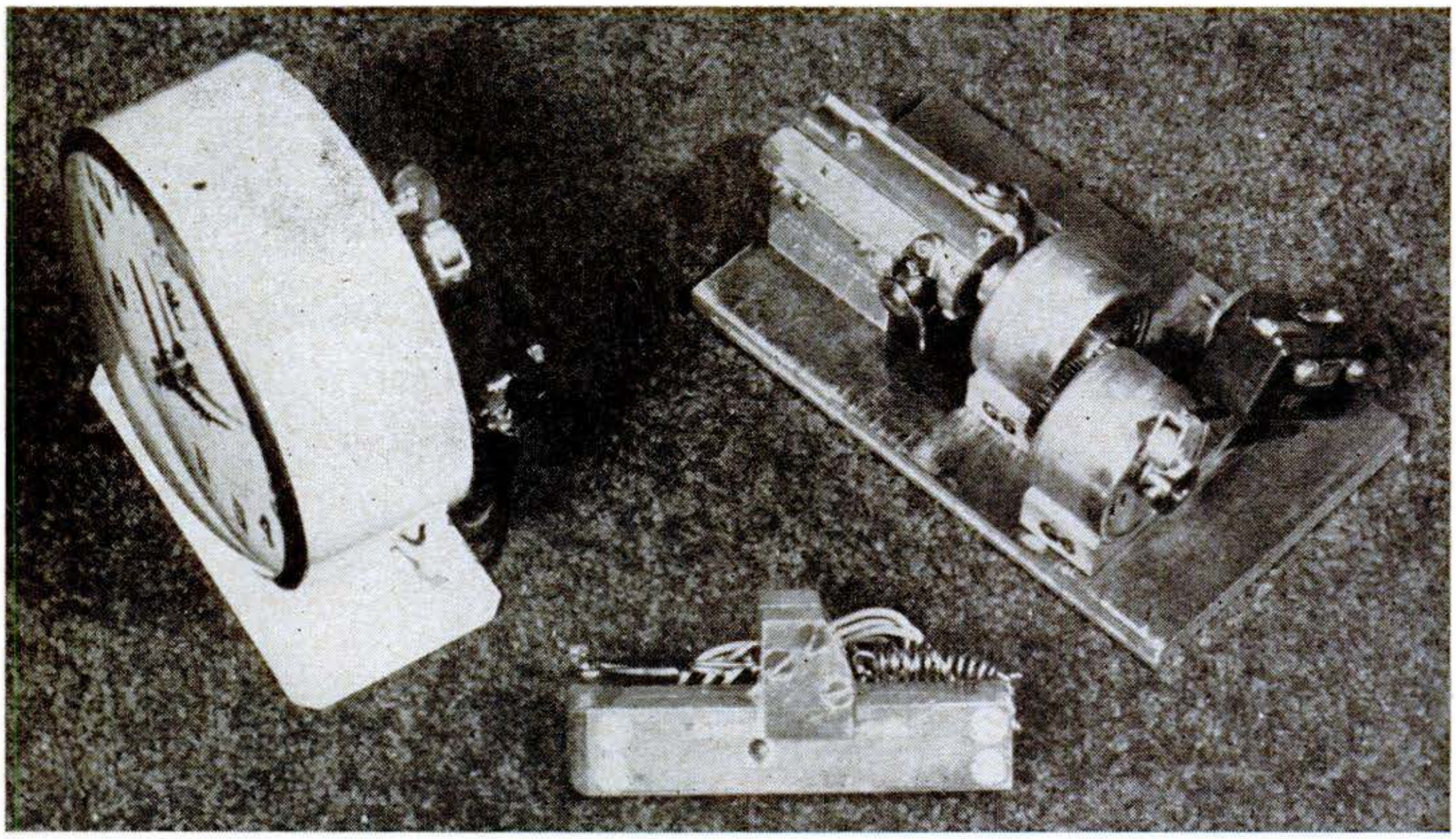
ment maintains secrecy, have been sent aloft under a single plastic bubble.

For excitement, the launching of a plastic balloon is the next thing to putting your last two dollars on a long shot at Hialeah. The weather must be good for observation. The wind cannot be too high: the plastic is fragile and subject to tearing.

First of all come safety precautions for other aircraft. The chances of collision are remote, but the Civil Aeronautics Administration and the Weather Bureau are advised of each flight in advance.

A ten-wheeled truck snakes a train of anchor boxes, special launching equipment, a helium-bottle dolly, wiring for the electrical cutting of cords holding the load line, and other paraphernalia onto the field, about a hundred miles from Minneapolis. This permanent site was chosen because it is remote, free from intrusion, and off the scheduled airways.

The top of the balloon, where the helium bubble will develop, is laid out in the lee of an unused airplane hangar to protect it from the wind. The rest of the envelope is



Either alarm clock, far left, or miniature, battery-fed motor with reduction gear, far right, is used to time release of parachute. Shown between them is load-line cutter. Upper-air research was started under auspices of Special Devices Center, Office of Naval Research, Port Washington, N. Y.; is directed by T. R. James, head of company's Aeronautical Research Lab.

Copyrighted material

strung downwind with all the gentleness of a mother's caress. As an extension of the downwind line, the load line, complete with its parachute and instruments, is hung on forked standards and anchored by boxes of sand. The load line must be put under exactly the right amount of tension. A slack line might cause an instrument to snap off when the helium bubble is released. That has happened.

The input of gas is measured volumetrically. Wind velocity and direction are checked minute by minute. If the wind shifts, the direction of takeoff must be aligned with it.

Now is the time. A tube, also of plastic, which has been feeding helium to the balloon is withdrawn. Wrenches close the gas bottles. The truck hauls away the dolly. One man prepares to release the bubble. Two others stand within sprinting distance of the anchor points—there may be an emergency. A hundred feet to the side a fourth man will close successive circuits to chop the anchor cords.

The man in charge picks up a megaphone. "Set?" The men downwind respond individually . . . "All set."

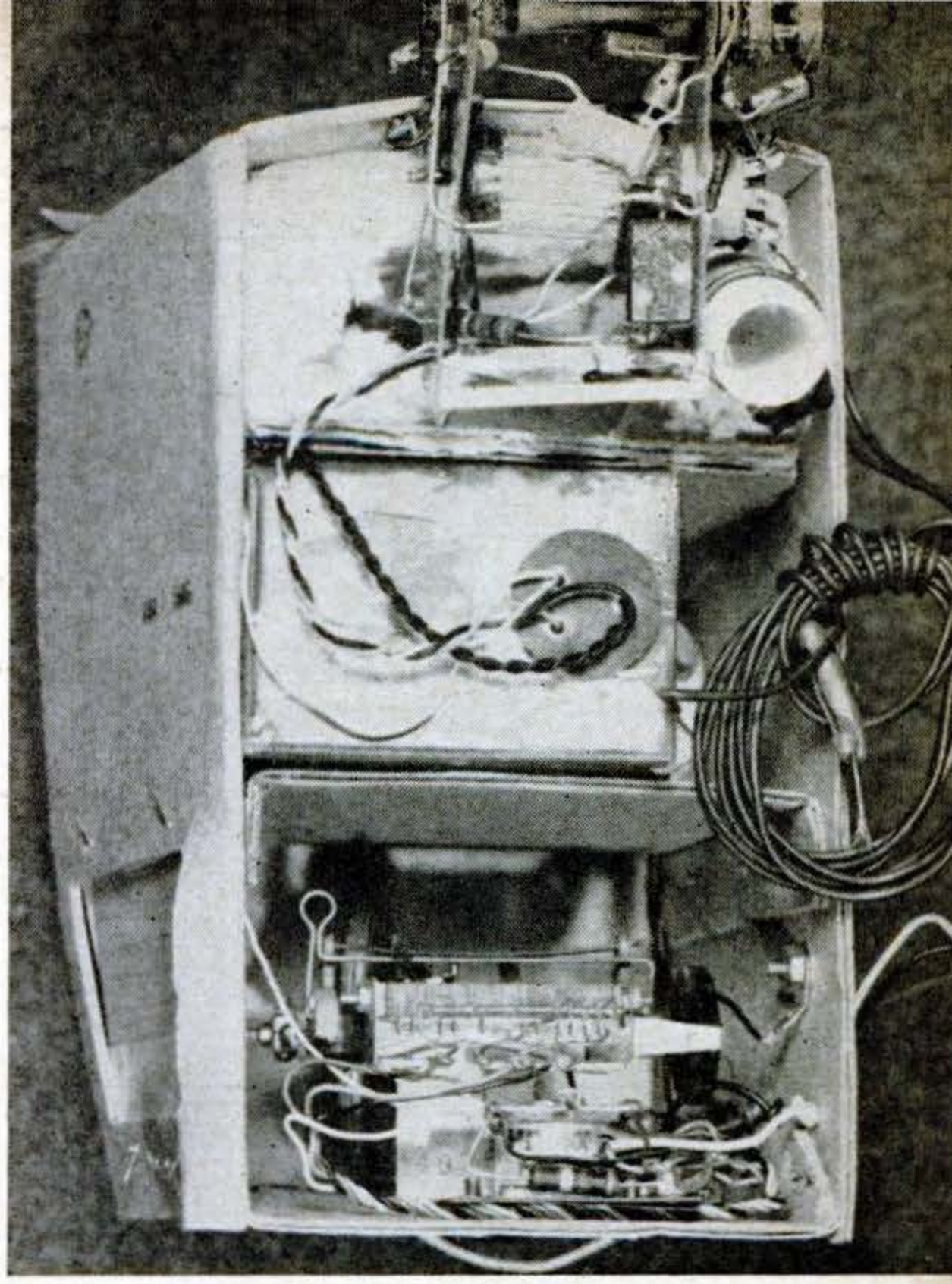
The bubble soars. As it picks up the folds, the balloon becomes a cobra. For a second or two it writhes. It weaves. Now it has seized the load line. Up goes the parachute. As fast as the tongue can name them off, instruments, radar screens, radiosonde, and finally a bag of sand for ballast are airborne. The sand bag goes along only if there is a shortage of instruments, sent in for the flights by colleges and other institutions collaborating on fundamental upper-air research.

Tracking a Soaring Laboratory

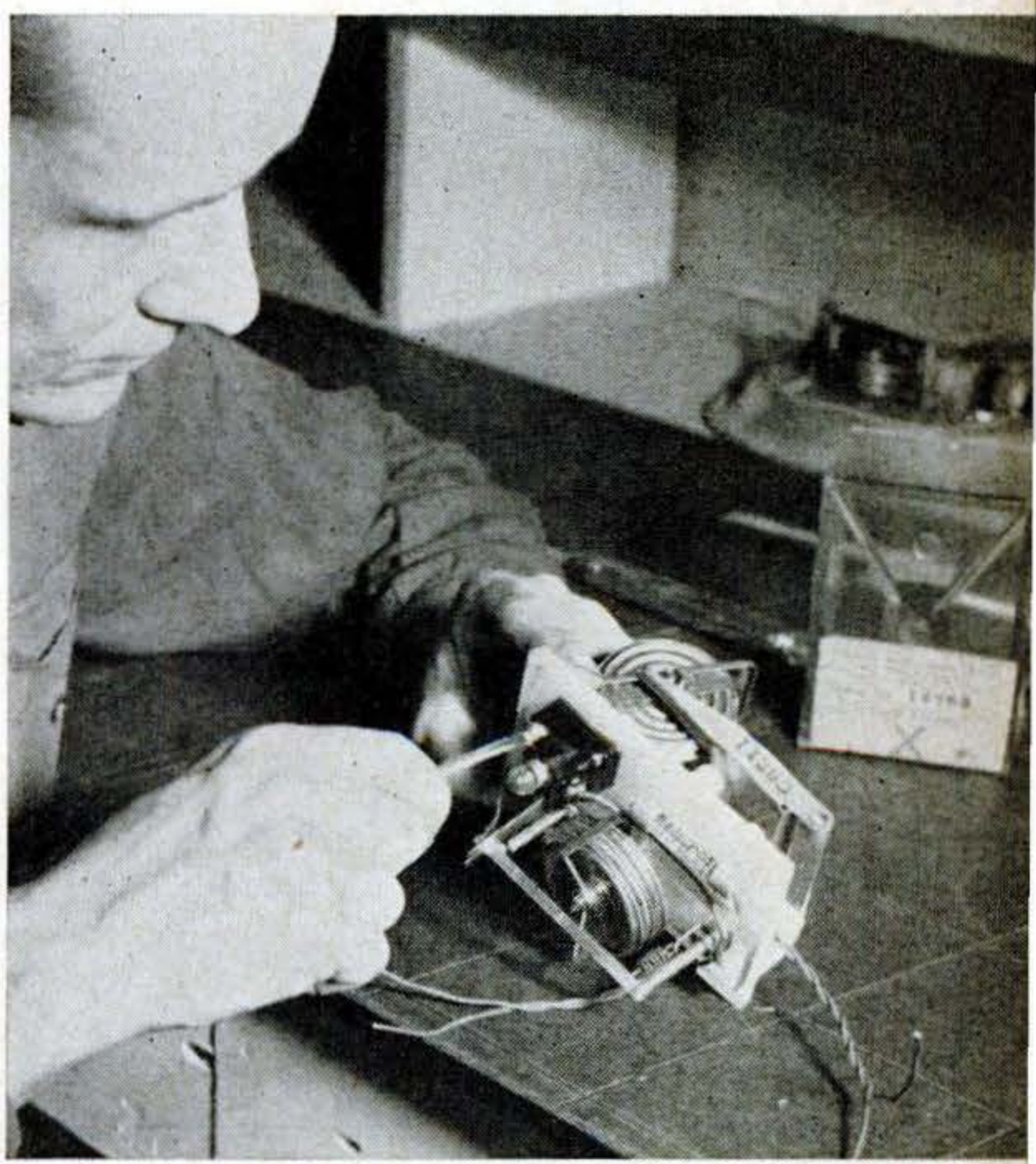
The work has only begun. Now the balloon must be tracked. Its trajectory supplies valuable meteorological data. One man goes to the theodolite. The rest of the crew clumps upstairs to the field control tower above the hangar.

Tracking is going on in other places, too. Within a diamond-shaped pattern 100 miles long and 60 wide, observers aground are sending in azimuth and elevation reports as frequently as once a minute. Radio direction finders and radar equipment are trained on the balloon. Four shortwave radio communication stations correlate all this information, and it is entered on charts for future study.

Not much more than an hour has passed;



Radiosonde contains, from top, tiny radio sender, battery, and baro-switch unit. Switch, run by aneroid cell, selects circuits for sending back temperature, humidity, and air pressure.



Aneroid-tripped electric light is hitched to parachute to warn aircraft when descent is made after dark. Cell cocks on way up, switches on flashing light at 20,000-foot level on way down.

Copyrighted material

the balloon has levelled off at about 100,000 feet, its ceiling. Through the theodolite telescope it looks like a transluscent pear, less than half the size of a pea. Its load is not visible. Even if the parachute were large enough to be seen, its red color would reflect no light to the eye.

Hours of methodical receipt and entry of reports on the balloon's course go by. Suddenly the man on the theodolite reports: "Parachute's cut loose! Balloon's in four pieces!"

A telephone rings. "Right," says the man on duty, answering, "four pieces at 4:27. We caught it." That was an observer calling in. A voice pages the tower on the short wave: "Broke into four pieces at 4:27."

Shock from inertia forces alone, induced by the balloon losing its load, destroys the delicate envelope to keep it from wandering around aimlessly in the sky.

The day's chores are done now. In anywhere from a half hour to an hour the parachute will touch the ground and collapse. Attached to the radiosonde are directions for the finder: Please ship the parachute and instruments back. That system is unavoidable. Only now and then can the parachute be tracked by radar.

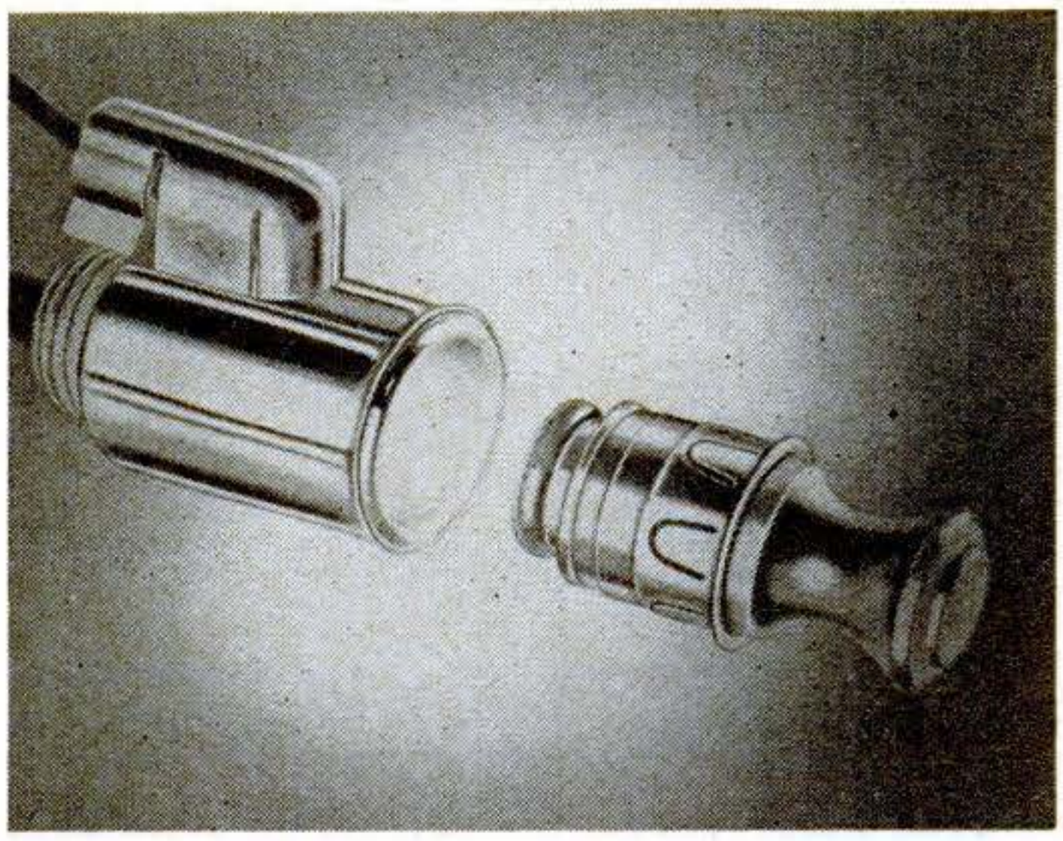
Few parachutes and instruments have been lost, out of scores of flights. Some remitters don't use their heads, of course. One cut a couple of precious shroud lines off the parachute to wrap his package for the post office. Another man, a trapper who stumbled on the gimmicks in the wilds of the north country, pulled his gun and shot up a couple of instruments.

The project is still experimental in that research never ends. For example, around 70,000 feet the radio transmitters may begin arcing between terminals because the air becomes too thin to act as a non-conductor. Something must be done about that.

Temperature-measuring equipment is also inadequate. It gives, not the temperature of the free air, but that of the air plus solar radiation effect. No instruments have yet been developed to measure pressure and dew-point accurately between 80,000 and 100,000 feet and telemeter the data back.

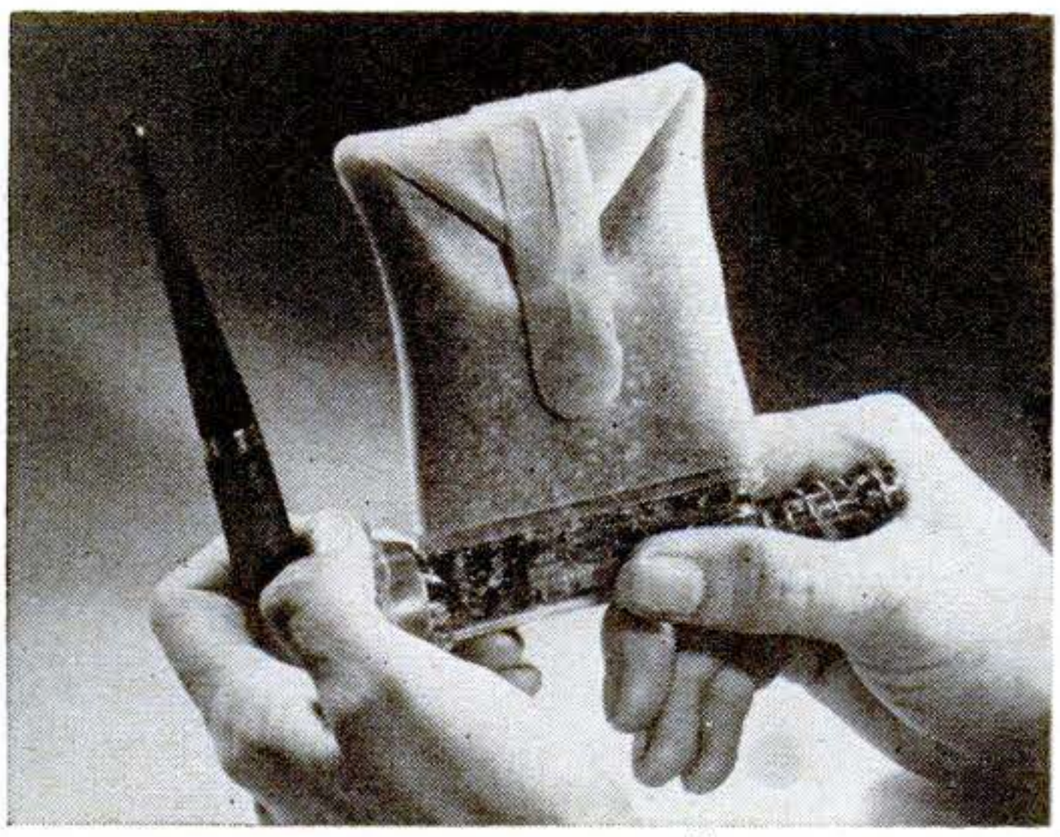
These are details. The end product of upper air exploration is a better understanding of our planet. Cosmic radiation and meteorological research alone will yield results that will benefit all mankind.

That realization helps the men get their feet on the floor when the alarm goes off at 3 a.m., signaling another day to fly a balloon. END



Cigarettes in the Dark

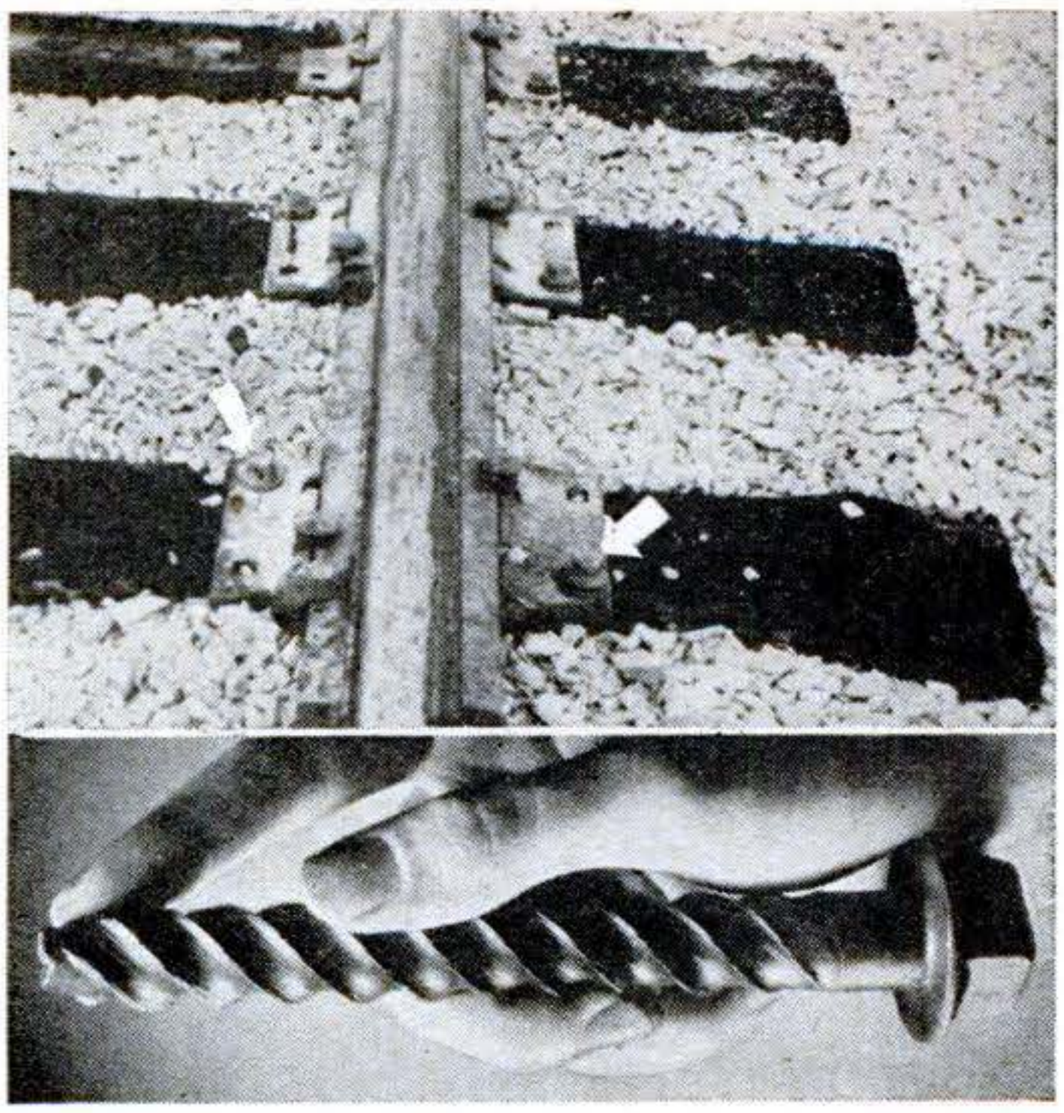
HAVE you ever fumbled getting the "pop-out" cigarette lighter back into its dashboard well at night? You won't have that trouble with this new Vis-O-Lite ®. As you light up, the receiving well glows so that you can't miss it on the return journey. According to the manufacturer, Casco Products Corp., of Bridgeport, Conn., the new lighter not only keeps your eyes on the road, but prevents dashboard scratching.



Pouch Fills Pipe

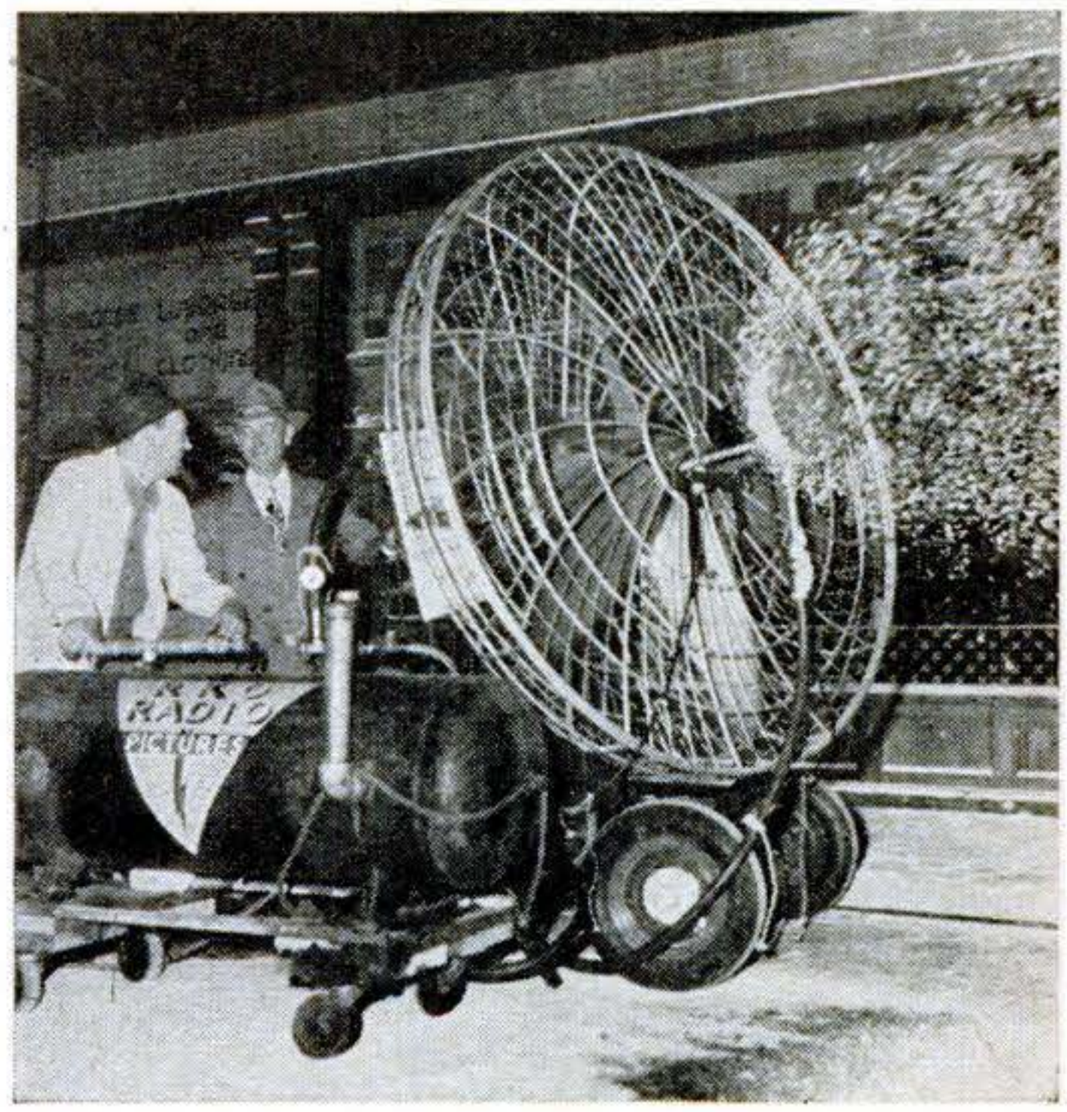
TOBACCO stays fresher in a new plastic pouch, and smokers can pack a pipe without spilling tobacco. The pistonlike action of the plunger, shown extended above, pushes tobacco into the pipe and tamps it firmly in the bowl. To close the pouch, the plunger is pressed back into place and locked by turning the knob at its end. Made by the Phil-O-Matic Co., of Springfield, Ohio, the pouch fits into the pocket of a shirt.

Copyrighted material



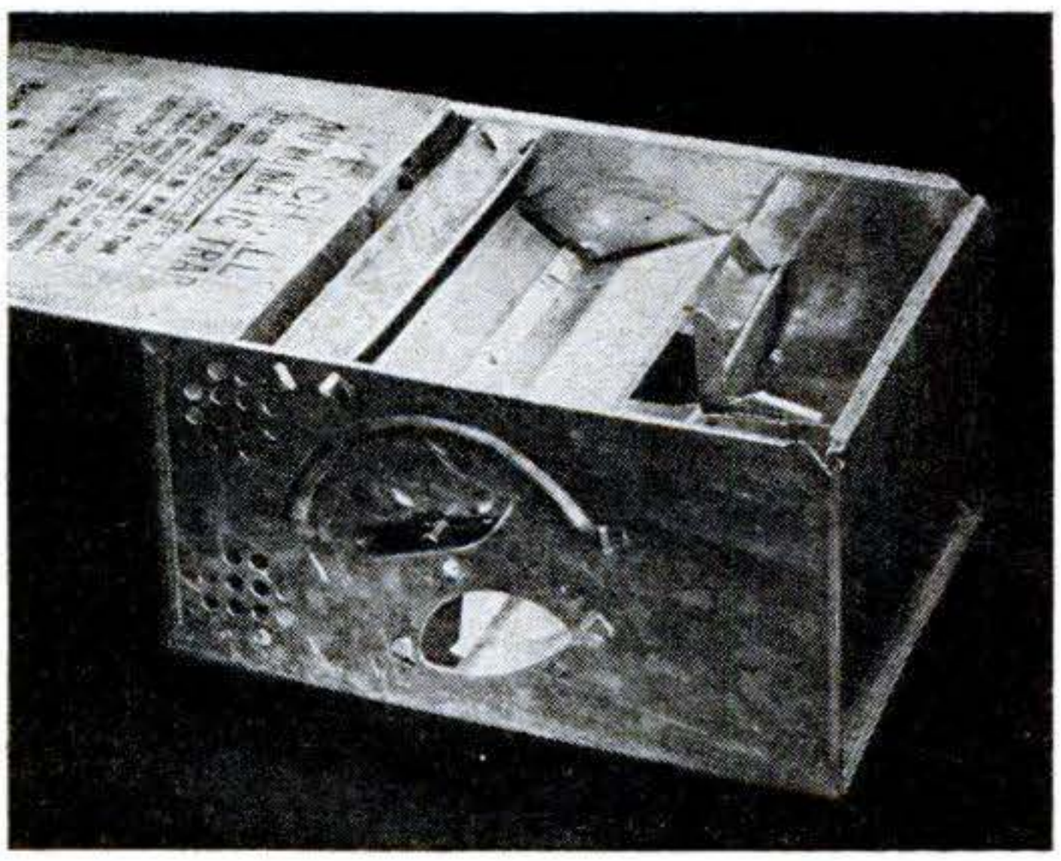
Rails Held Rigid

THE danger of spreading rails is reduced by this new corkscrew railroad drive spike developed by the Oliver Iron and Steel Corp., of Pittsburgh, Pa. It replaces the standard outside spike to fasten the tie plate securely to the tie (arrows). A hole is first drilled, and the spike driven in; the thread grips the tie so that each spike will hold as much as 25,000 lb. Once in, the spike must be unbolted with a wrench.



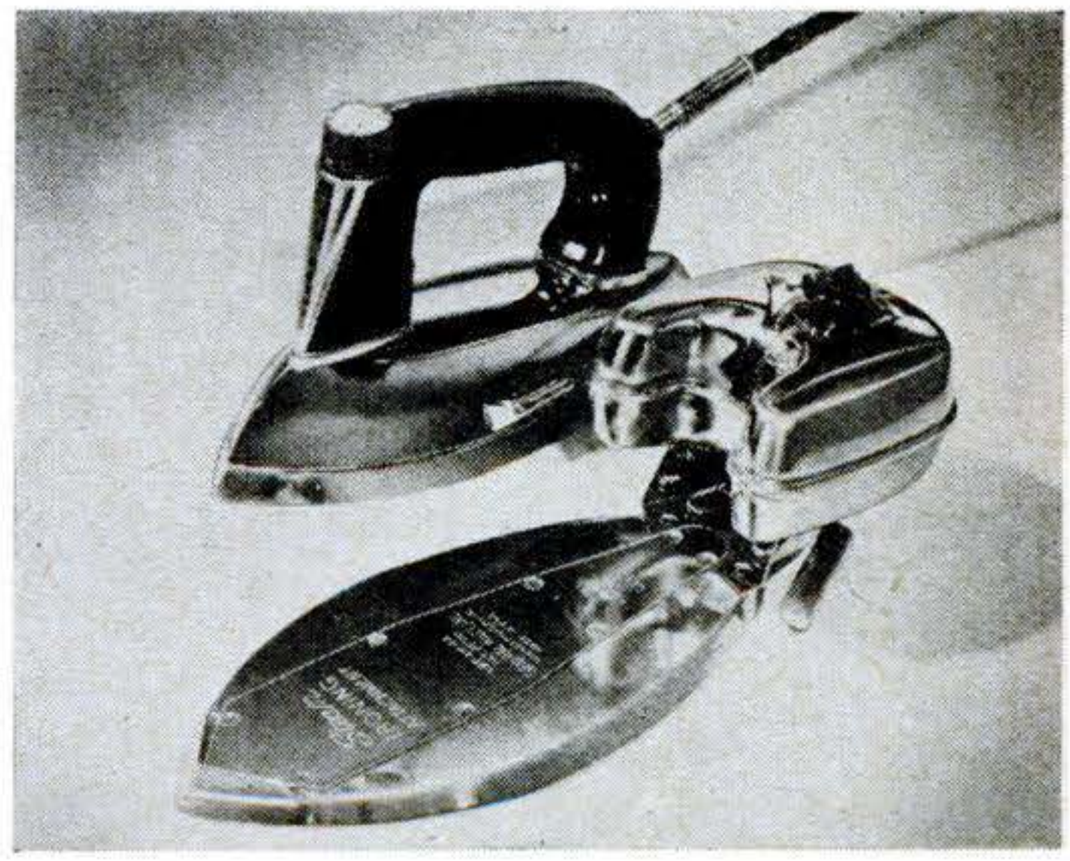
Blizzards on Call

WITH this machine snow falls on Hollywood, from a blizzard to a gentle flurry, just as the director wants it. The tank at left holds a fire-extinguishing chemical. Mixed with water and air, it is fed into a perforated aluminum drum revolving in front of a fan that blows the storm over a movie set. The machine can pile snow up to any desired depth, and it melts on an actor's clothing in a few minutes, just like the real flakes.



Curiosity Traps Mice

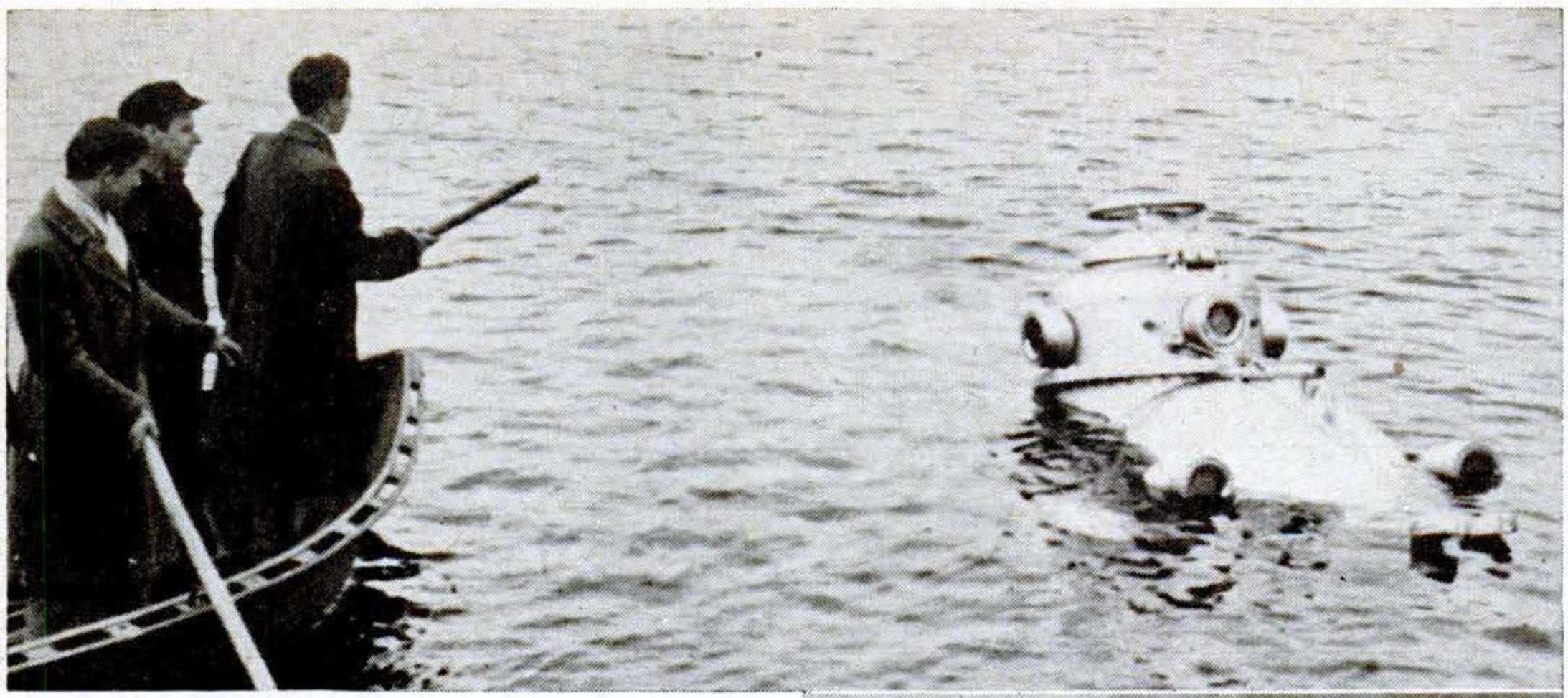
NO BAIT is needed to catch mice in this automatic Ketch-All Ⓣ mousetrap. Curiosity entices a mouse to enter, from either side, a runway in the trap. Once inside, the victim steps on a treadle, releasing a shutter that sweeps him into a cage, still alive. The maker, Kness Manufacturing Co., of Albia, Iowa, claims that 25 mice can be caught with one setting. Winding a key sets the trap.



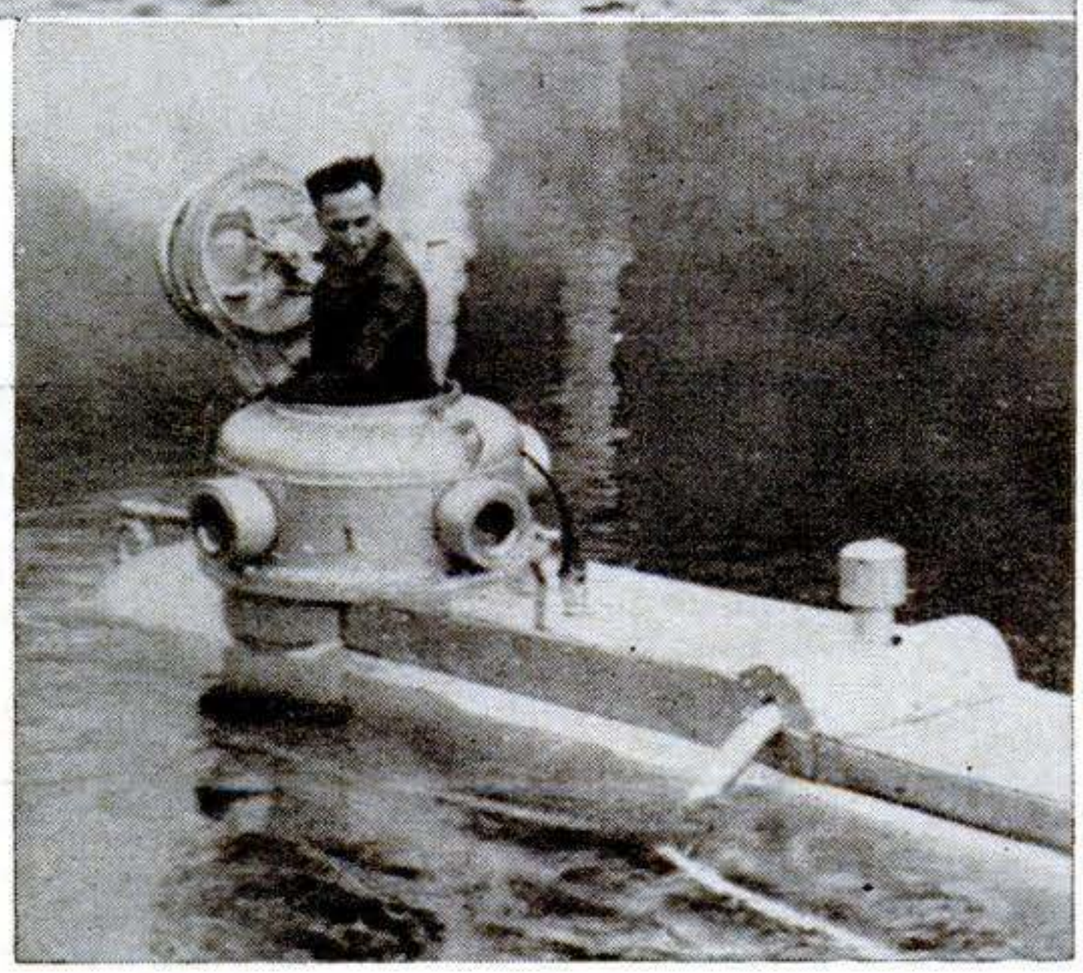
Pressing Problem Solved

HERE'S a two-in-one combination that gives you steam for ironing without predampening and for pressing without a dampened cloth. The steam attachment, in foreground above, is an auxiliary base that slips under a General Mills electric iron, also illustrated. Resembling an outboard motor, the tank holds 1½ cups of water, providing enough steam for 45 minutes of ironing.

Copyrighted material



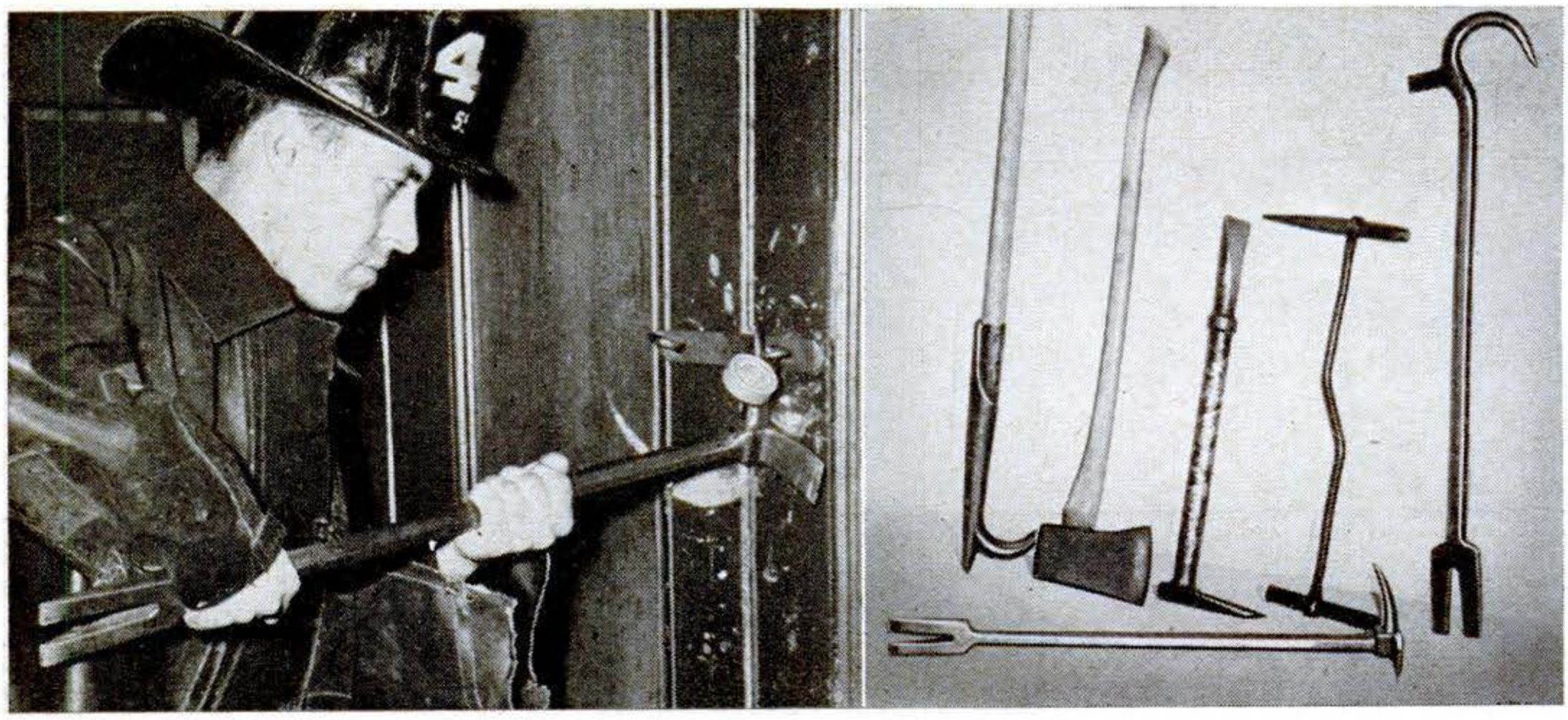
Tiny Sub Is Deep Diver



SUBMARINE history is in the making if the one-man sub, shown above about to submerge, lives up to the claims of its Italian designer, Alberto Vassena. It is reported that in tests at Lake Como, the craft went down 771 feet. (700 feet is reported "bottoms" for war-developed German subs). Vassena, shown in turret at right, hopes to go down 1,312 feet, and claims that he could do better except that that is the deepest point of the lake. For salvage purposes, the craft has a motor-operated lifting device fixed to its bottom, said to have a hoisting capacity of 10 tons.

Lightweight Tool Gives Firemen New Weapon

FIRE fighters often have to crash through a door or wall to reach a blaze in a hurry. A new, lightweight tool, being used by the fireman below to break open a lock, does the job of all five of the tools shown lined up at right below. These weigh 49¾ lb. as against the 8½ lb. of the new all-in-one tool seen at the bottom of the picture. It was developed by Deputy Chief Hugh A. Halligan, of the New York City Fire Department.



Copyrighted material

By George H. Waltz, Jr.

Emergency methods and new materials may bring radical changes in ancient craft

The headline on this page was set by placing cardboard letters in a Fototype composing stick. The author's name and the two lines below it were set the same way. The result is one of printing's new looks. Another is the type you are now reading, which was set on a Vari-Typer.

There is hardly a large printer or publisher who is not jealously guarding and developing at least one new printing wrinkle that he regards as "top secret." Even the list of new inventions that are known and can be talked about is a long one. It ranges from automatically produced plastic printing plates to a revolutionary new electronic printing press in which the ink literally jumps from the printing plate to the paper.

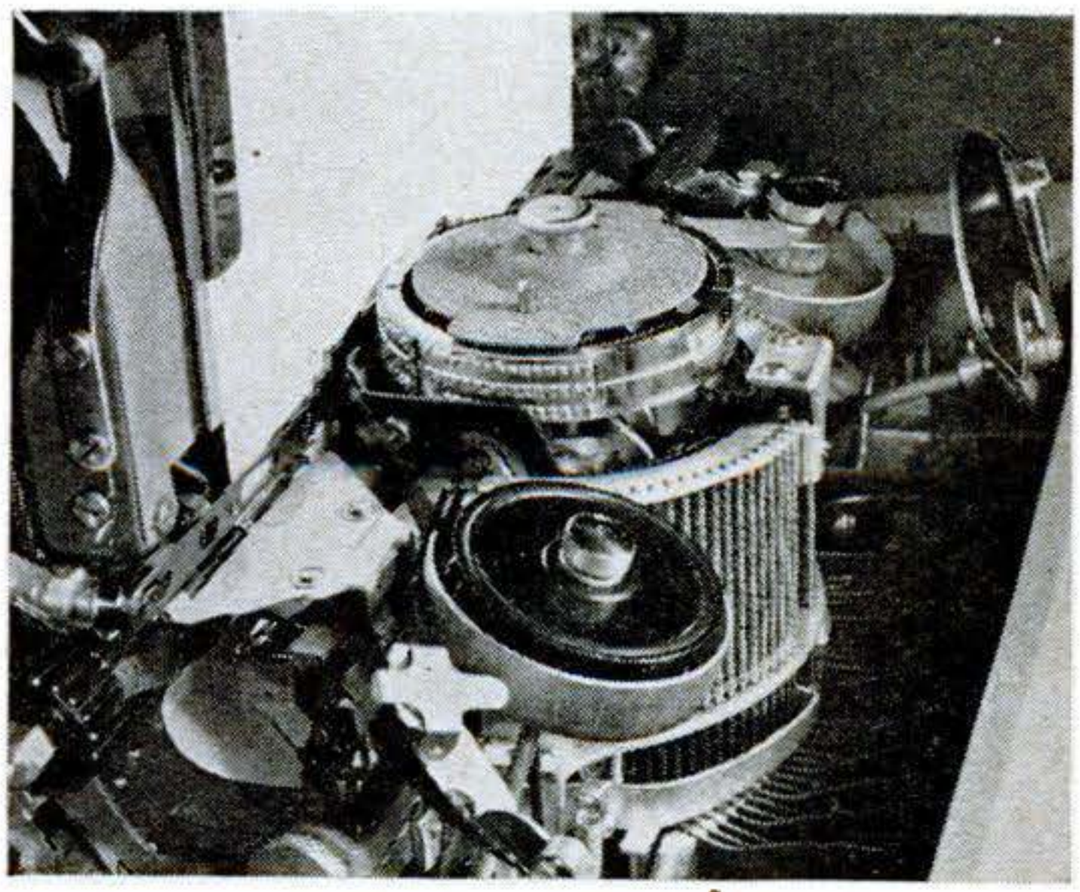
This revolution in the business of putting words and pictures on paper has been a long time coming. Except for refinements and mechanization in the form of automatic type-casting machines and rotary presses, there have been no radically basic changes since the 15th century, when Johann Gutenberg first used movable metal type to print Bibles.

But 1948 certainly looks like a year for innovations.

Seven months ago, Chicagoans saw a new kind of newspaper. The pages looked as though they had been typewritten rather than printed. And, in a way, they had. The publishers had used a special kind of typewriter that spreads the letters out to fill each line. It was the first time this system had been used by a big city's daily newspapers. The Chicago publishers have proven that papers can be issued this way, but have found it a comparatively slow process, forcing them to advance many of their deadlines.

A labor dispute was responsible for the change-over. If it spreads, POPULAR SCIENCE and other magazines may be issued the same way.

The normal printing procedure of most newspapers and magazines starts with assembling the type for each line and casting it in the form of a metal slug. These slugs are produced automatically



Close-up of the Vari-Typer's type cylinder. When a key is pushed down, this cylinder turns to bring the right letter into contact with a carbon ribbon.

Copyrighted material

by a type-casting machine. A skilled operator, sitting at a keyboard, "types out" the copy provided him. As he hits the key for each letter, a metal mold for that letter, called a matrix, drops down into its proper place.

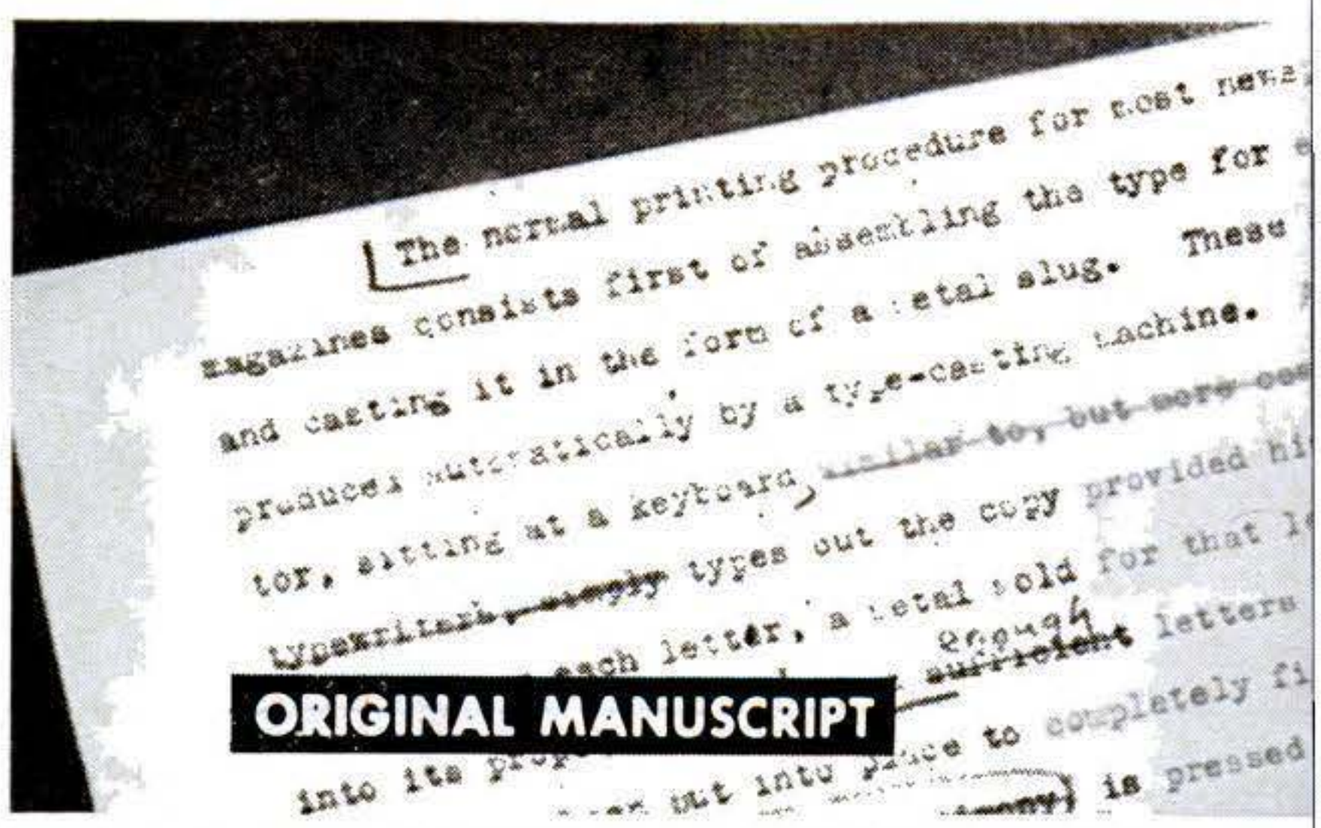
When enough letters and compensating spaces have been put into place to completely fill a line, molten type metal is pressed against the line-long mold, and a complete line of type is cast. This process is repeated for each line. These lines are assembled into pages from which the actual printing plates are made.

Last November, Chicago's newspapers suddenly found themselves without operators for their type-casting machines. Borrowing a few aces from the tricks used to reproduce photographs on a printed page, the publishers turned to the art of photoengraving. Instead of producing molds and casting the individual lines of type for each page, they could carefully typewrite their news stories to approximate column width. The columns, assembled into pasted-up pages, could be photographed, and then a printing plate could be made by the photoengraving process.

There was only one hitch. Newspaper readers are accustomed to even lines that begin and end flush on both sides -- not lines that are uneven along the right-hand margin, like those that come from an ordinary typewriter. For the solution, the publishers turned to the Vari-Typer and the IBM Executive Typewriter. These automatically adjust the spaces between letters and words in a line to make it come out flush at both ends.

The copy, however, must be typed twice. A first typing, gauged roughly to full column width, is necessary to determine just how much space must be added or subtracted to fill a line. At the end of each line, the typist indicates how much space must be put in or taken out. This step is called "pre-typing."

The rough copy, with its space notations, then goes to the operator of the Vari-Typer. If she wants to expand a line, she sets a dial to the number of spaces indicated by the pre-typist; to condense a line, she operates a special key. The Vari-Typer automatically does the rest -- adding or subtracting the right amount of space between characters to fill the line out to the width of a full column.



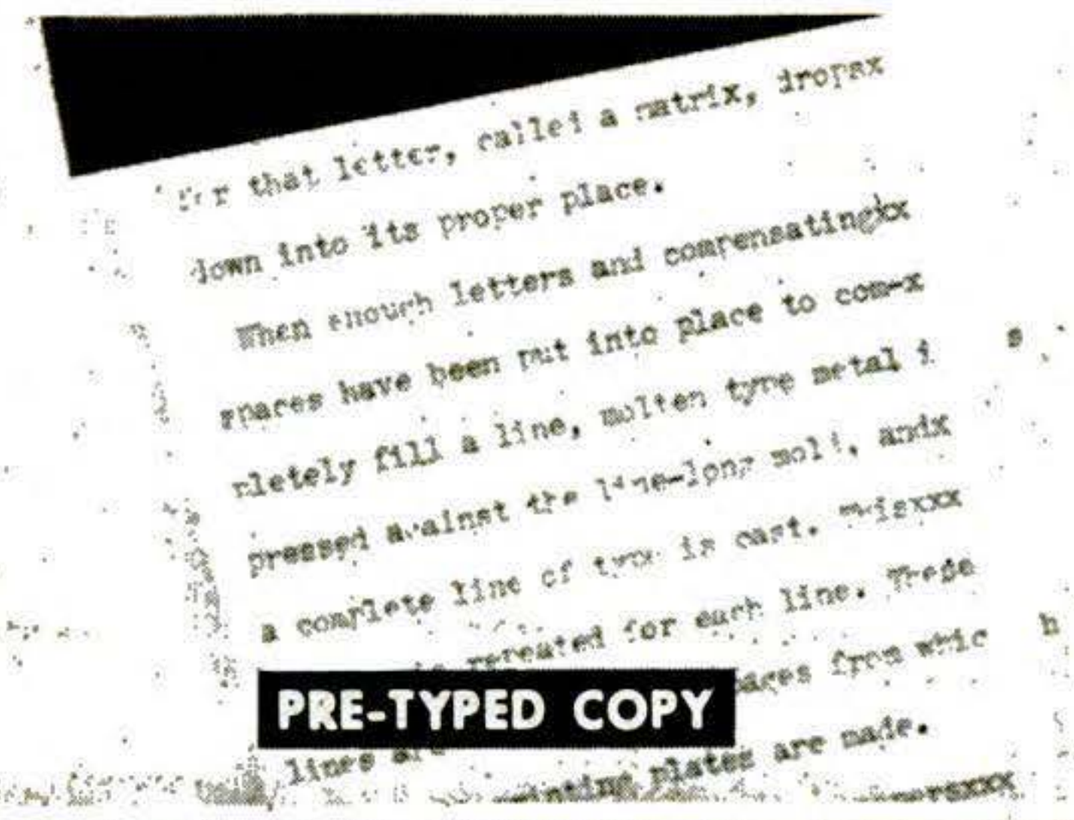
Working from the author's original manuscript (top), first step in preparing Vari-Type copy is typing roughly to column width. This is called pre-typing.

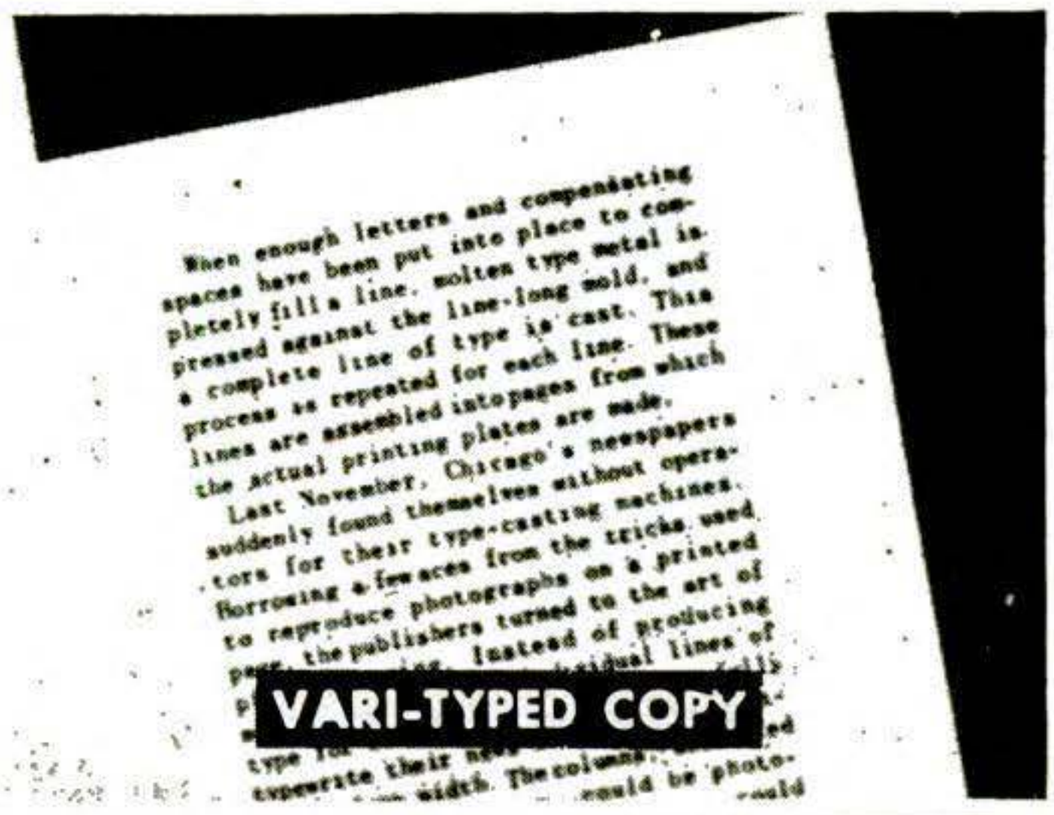
In the next step, the typed columns, together with copies of illustrations, are assembled into pages by pasting them in their proper positions on sheets of cardboard. These pages are photographed and the negative is used to produce a zinc etching. From these master etchings, the final printing plates are cast.

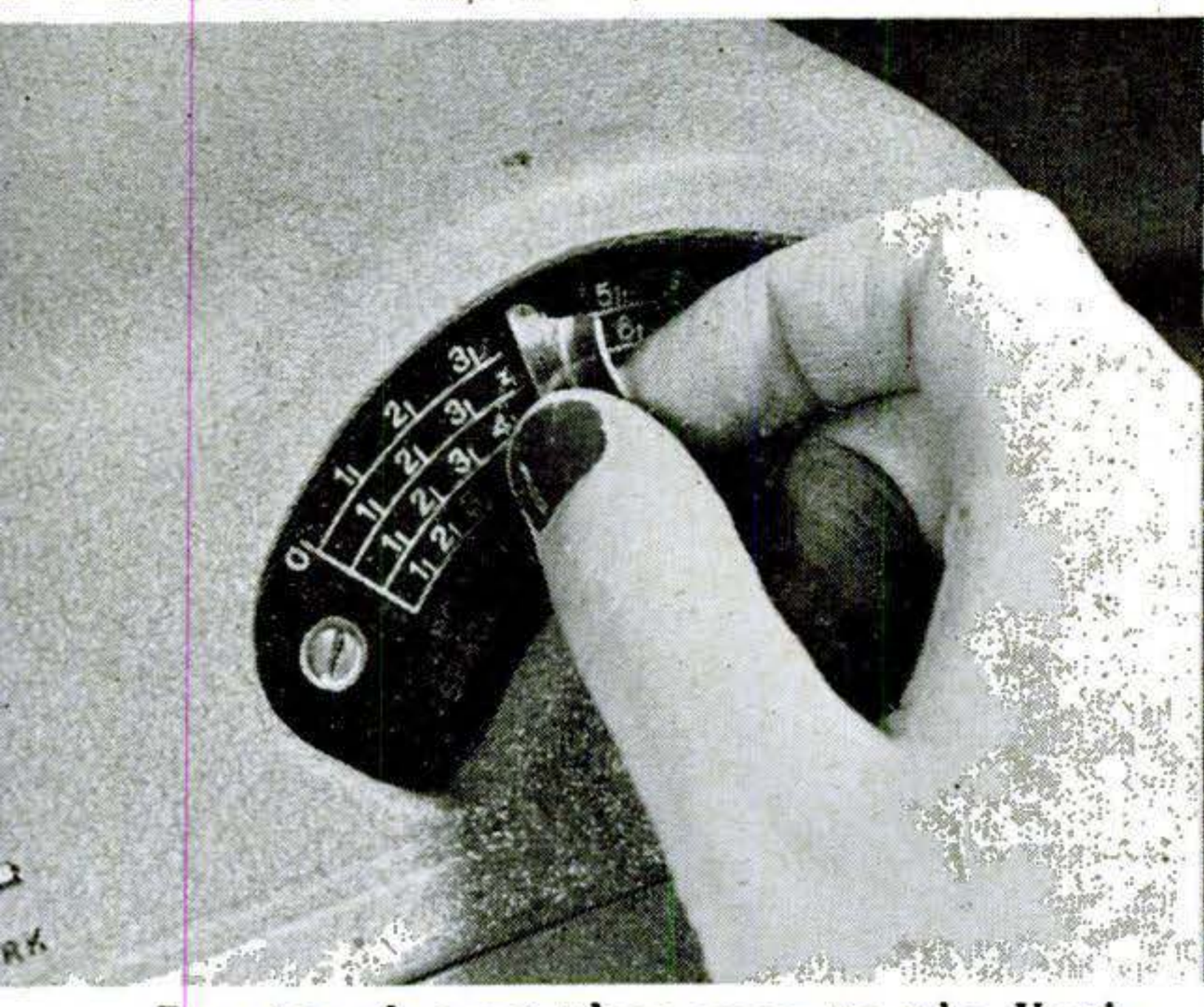
In the normal photoengraving process, a specially treated zinc plate is exposed to the negative. When the plate is placed in an acid bath, only what corresponds to the white spaces in the original copy are attacked or etched by the acid. The result is a plate with raised letters similar to ordinary type.

A revolutionary new engraving machine, recently unveiled by the Fairchild Camera and Instrument Corp., of New York, elimi-

Copyrighted material







Pre-typed copy then goes to the Vari-Typist. Following notations at end of each line, operator adjusts a dial to add space needed to fill the line exactly.

The Vari-Typer automatically expands a line. A special key is used to condense a line. The result is a column, as shown above, with an even right margin.

NEW INVENTION PROMISES TO REVOLUTIONIZE PRINTING

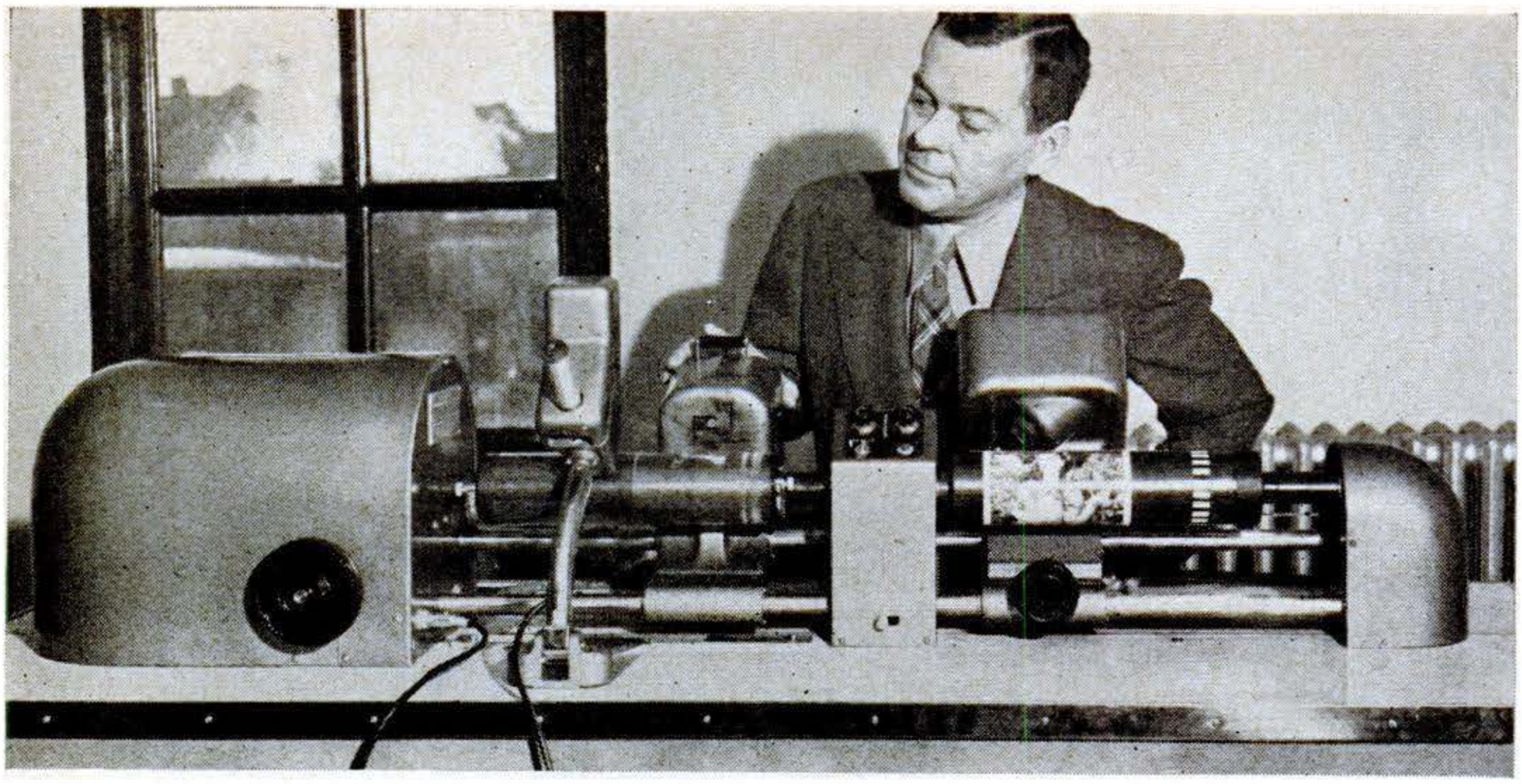
NEW YORK, N.Y.—The Ralph C. Coxhead Corporation of New York makes the announcement of a new invention, a machine which permits type composition in the office by an office typist.

The machine resembles a type- [illegible] appearance and [illegible]

Mr. Coxhead points out the interesting parallel of his new invention and the history of printing itself. The modern printing industry was born in 1448, exactly 500 years ago, when Gutenberg invented the movable type press. The Renaissance period got off [illegible] when the Gutenberg [illegible]

As this story went to press, a new and improved Vari-Typer was announced by the manufacturer. As shown in the work sample above, the machine not only squares the margins but also automatically allows wider spacing for wide letters like "m" and "w" and narrower spacing for narrow letters like "i" and "l."

Copyrighted material



An electronic shortcut for making photo-engravings, this machine needs only one operator. Above, the inventor, George Washington, Jr., is resting his right hand on cylinder holding the engraving stylus. At left is a microscope for making tonal adjustments. Right of center is the scanning electric eye.

The finished product as it comes off the Fairchild-developed photoelectric engraver. The lightweight plastic cut is next mounted on a wood or metal base.

nates the need for chemicals, cameras, or highly skilled workers. In it an electric eye replaces the photographic negative, an electrically operated and heated stylus takes the place of the etching acid, and a sheet of lightweight plastic is used in place of the zinc. Entirely automatic, it can produce a column-wide newspaper cut in 3 minutes and 40 seconds.

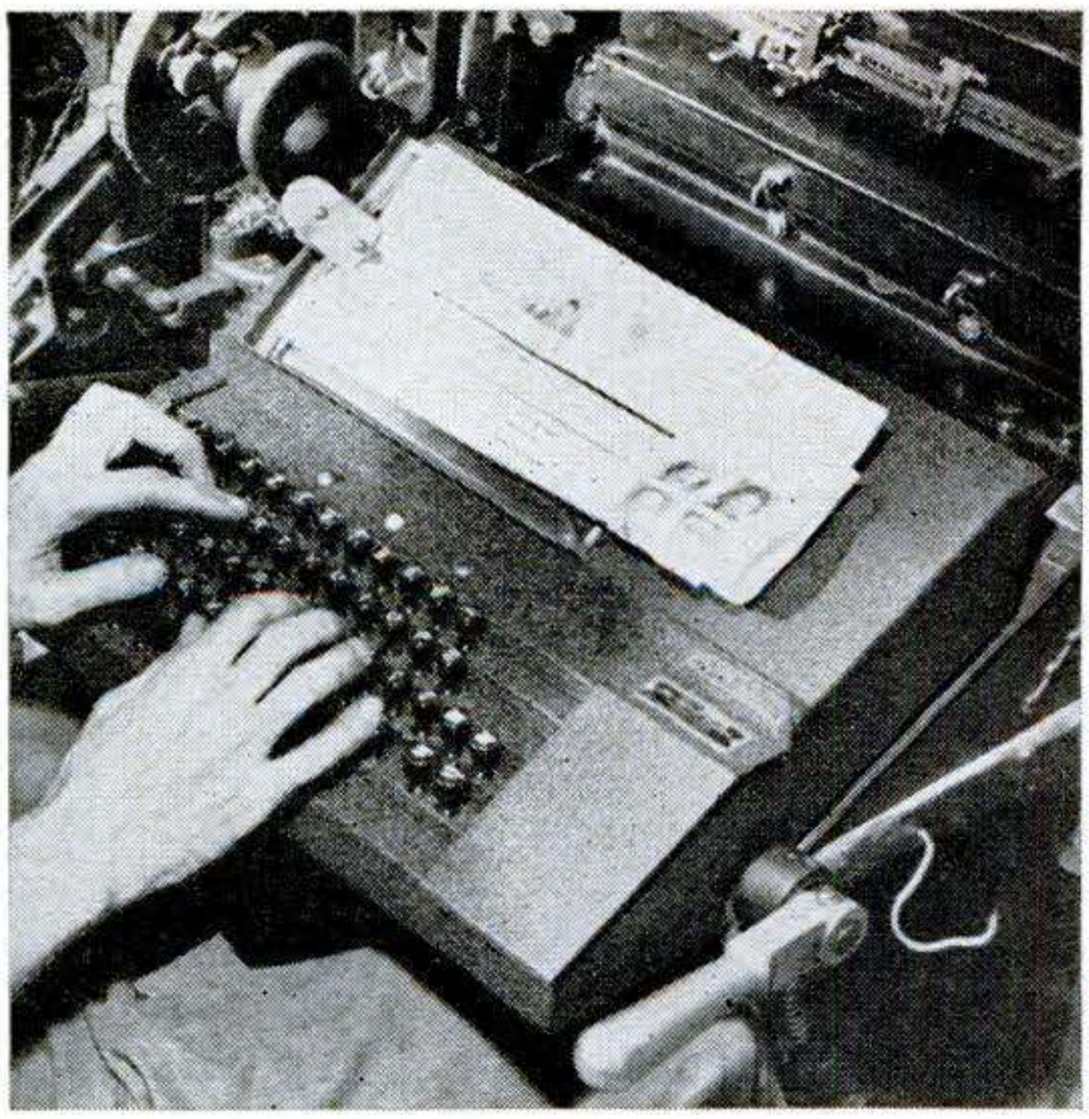
The new engraving machine resembles a small bench lathe. It has two long cylinders mounted along the same axis, and two carriages of "heads" that can be moved along the cylinders at a fixed and synchronized rate. One head contains a photo-electric cell that serves as a scanning device. The other holds the stylus. In operation, the photograph that is to serve as the copy for the engraving is placed on the right-hand cylinder under the photo-electric scanner. A sheet of plastic is placed around the cylinder under the heated stylus.

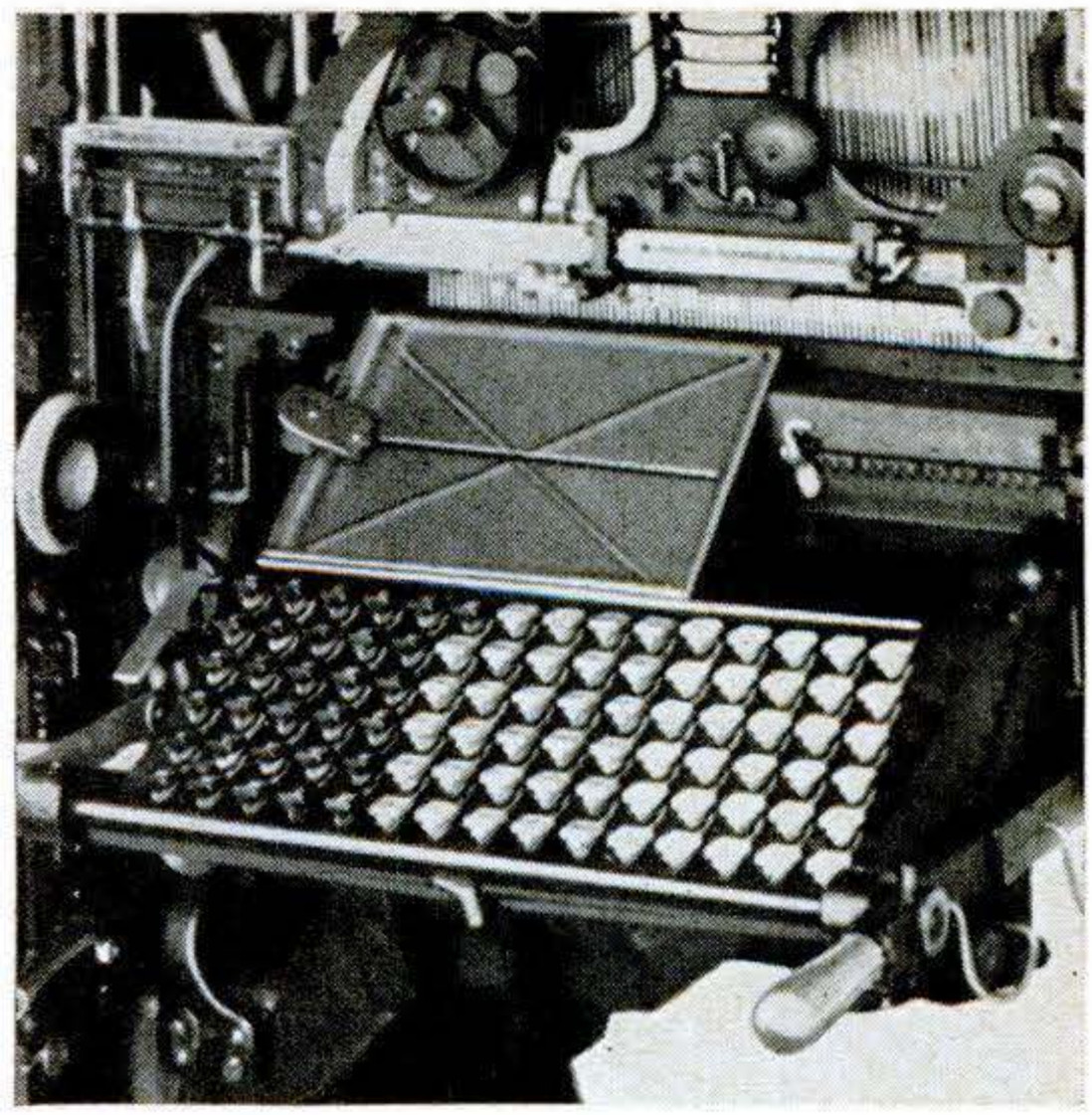
In effect, the machine is a picture transmitter and receiver rolled into one. It literally sends a picture to itself. The photoelectric cell scans the photograph, turning its lights and darks into electric impulses. At the same time the stylus moves along and, actuated by impulses from the photocell, jabs small, pyramid-shaped depressions in the surface of the lightweight plastic sheets.

These depressions correspond to the lights and shades of the photograph. The result is a conventional half-tone pattern of dots. This plastic engraving then is trimmed, washed, and mounted on a metal or wood base.

Another new advance in the making of printing plates is the use of lightweight magnesium. The conventional stereotype plate for a newspaper page weighs 46 pounds; an engraved magnesium plate of the same size tips the scales at nine pounds.

Copyrighted material





Type casting the easy way. The simplified electric Kellogg Type-O-Writer, above, can be handled by any good typist. It fits over the complicated Linotype keyboard shown at right. Tapping of Type-O-Writer keys operates keys of the type-casting machine. The keyboard can be attached to any slug composing machine.

These lightweight plates are easier to handle and permit higher press speeds.

Still another innovation is the Type-O-Writer, developed by the Kellogg Switchboard and Supply Co., and now being used by one of Chicago's largest printers. It eliminates the need for skilled operators. It consists of an electrically operated standard typewriter keyboard fitting directly over the keyboard of the type-casting machine. Any good typist tapping out words on its 45-character keyboard operates the more complicated 95 keys of the type-casting machine

Going one step further, another system makes it possible to operate a type-casting machine by remote control, even from another city. Operated like a teletypewriter, the machine produces a tape perforated in code that can be fed into an attachment on a type-caster, operating the latter's keys.

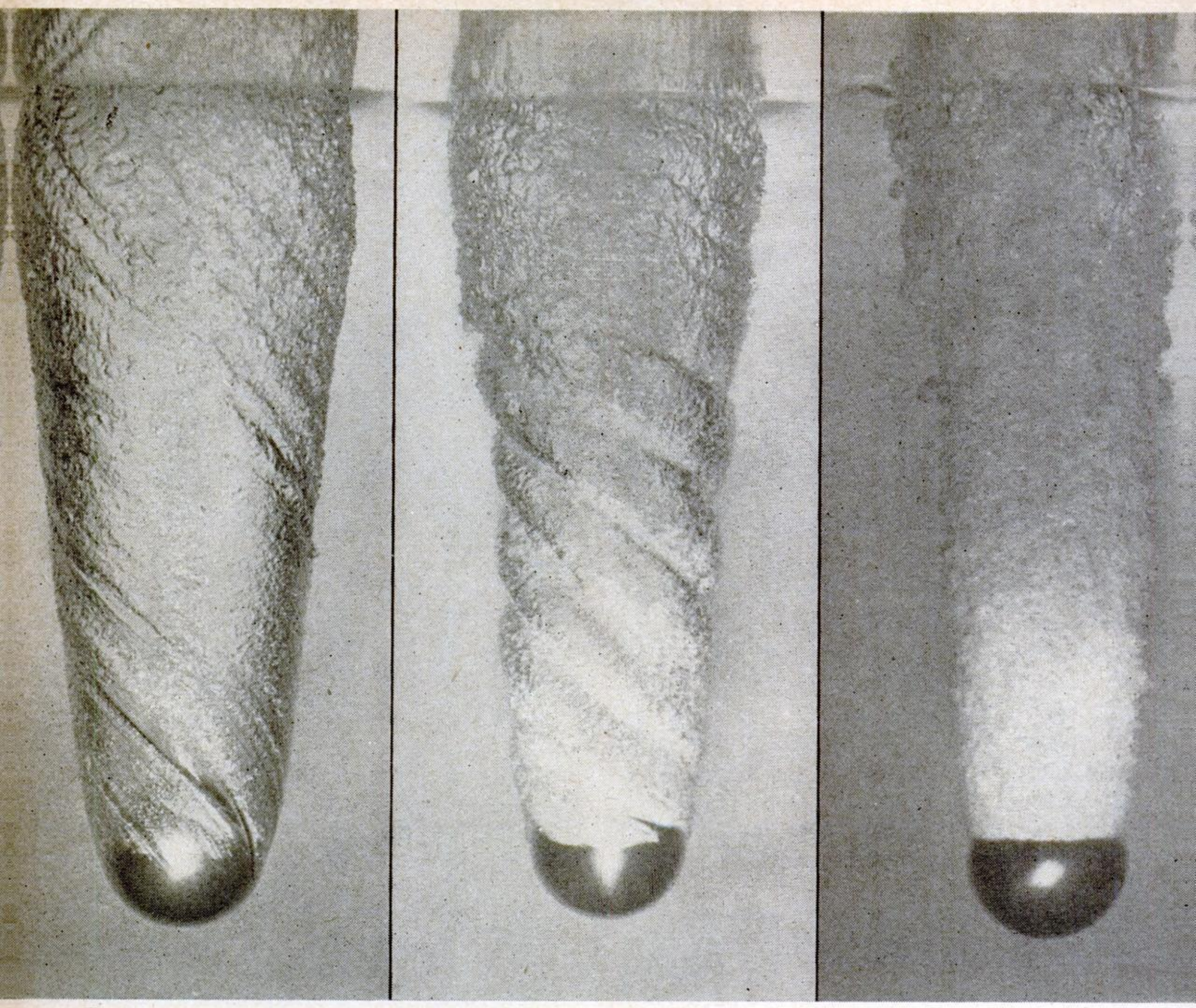
The publishers of Time Magazine now use such a system. Operators in New York tapping on typewriterlike keyboards can telegraphically punch tapes to operate type-casting machines in Philadelphia, Chicago, and Los Angeles. With this setup it would be possible to set a story here while the reporter is writing it in London or Paris!

Then there is the Fotosetter. It eliminates the need for type-casting machines entirely -- at least in offset printing. It does away with the intermediate steps of setting type, preparing a perfectly printed proof of that type, and photographing the proof to obtain a negative for engraving. The Fotosetter operator simply types out his copy on a keyboard and the finished negative -- not type -- comes out. The Government Printing Office has been testing a machine since 1946.

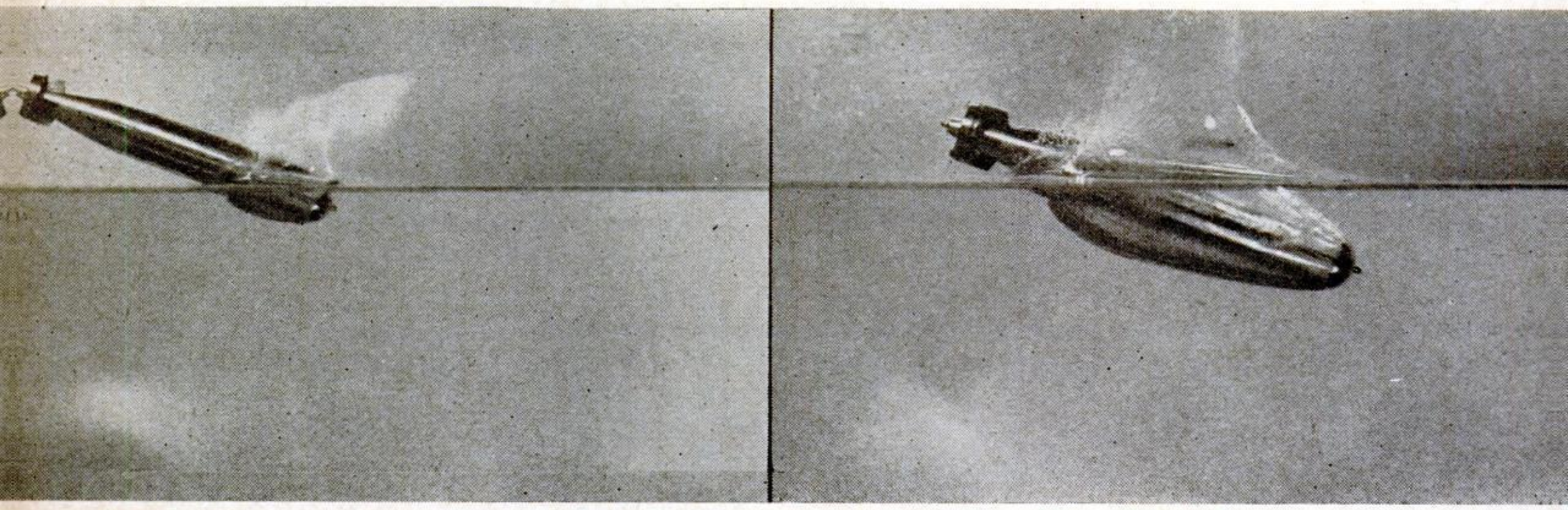
Since the top speed possible with any printing press depends to a large extent on how quickly the ink dries, researchers are playing with all sorts of new rapid-drying inks. Already available are cold-set inks that are applied hot, and dry instantly when they come in contact with the cold paper; moisture-drying inks that (like cements that set under water) set when allowed to absorb moisture; and pressure-drying inks that depend on the printing pressure to squeeze out the moisture and dry them.

One of the most revolutionary of all the new printing processes in the offing employs a "jumping" ink. Called the Electronographic Printing Press, it, like more and more of our modern machines, depends on electronics for its operation. In the Electronographic Press, the paper never touches the printing plates. Instead, the ink, electronically controlled, literally jumps through the space of a small gap from plates to paper! END

Copyrighted material



Three-inch steel balls leave curious patterns—and valuable hydrodynamic data—in their wake when they are dropped into a laboratory tank and photographed at 1/500,000 second. In this test, the balls (from left to right) were spinning at 24, 80, and 120 revolutions per second after dropping from a solenoid located 12 feet above the surface of the water.



Starting its run, the miniature hits the water at 143 feet a second, tossing up tiny plume, then burrows an oddly shaped hole in the surface. Exposure time here was 10 microseconds.

Copyrighted material

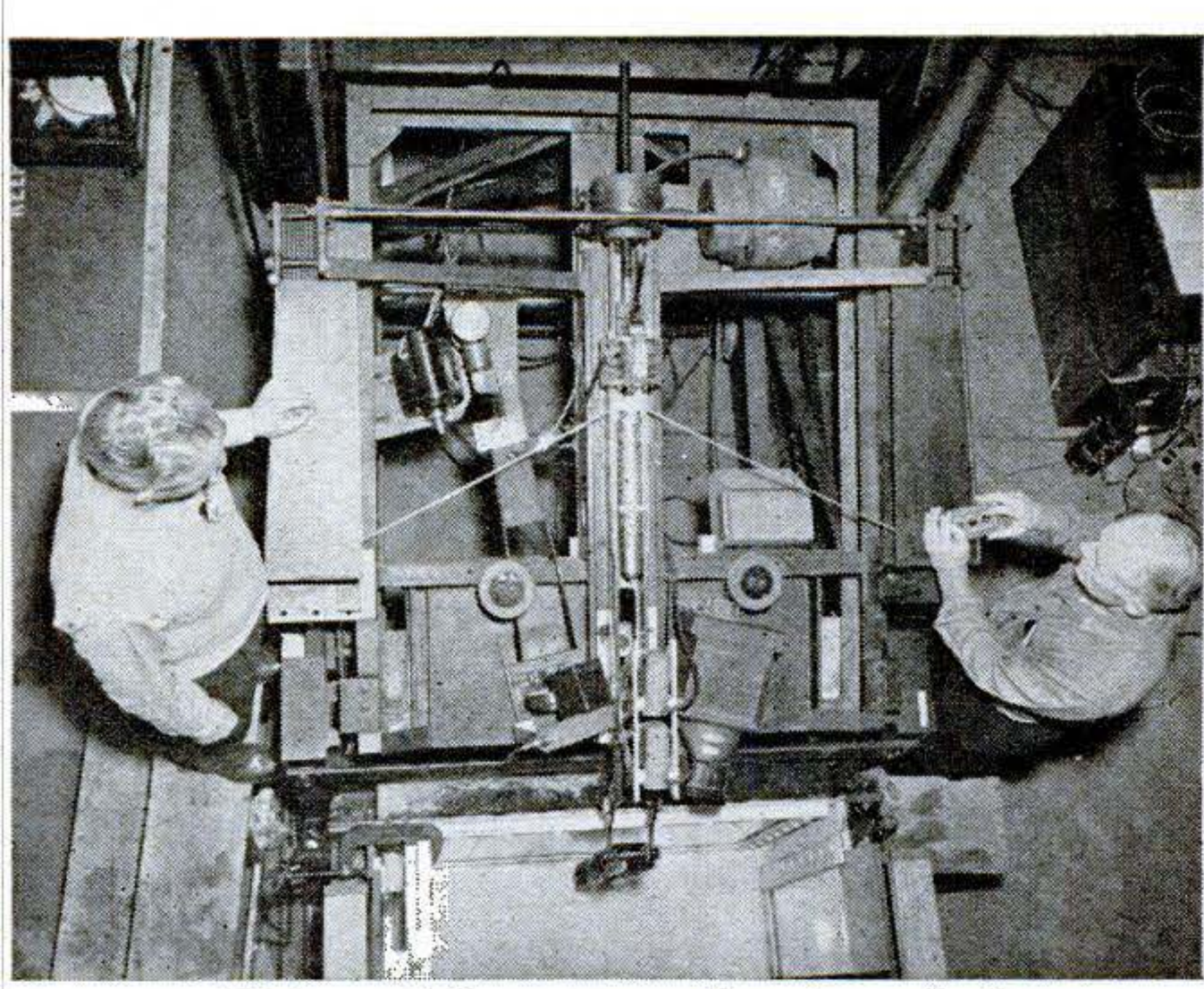
Torpedoes From Crossbow Help Navy Improve Aim

USING a mechanized crossbow and a 300-foot "pea shooter" instead of airplanes, the U. S. Navy is hard at work giving its lethal aerial torpedoes a sharper punch.

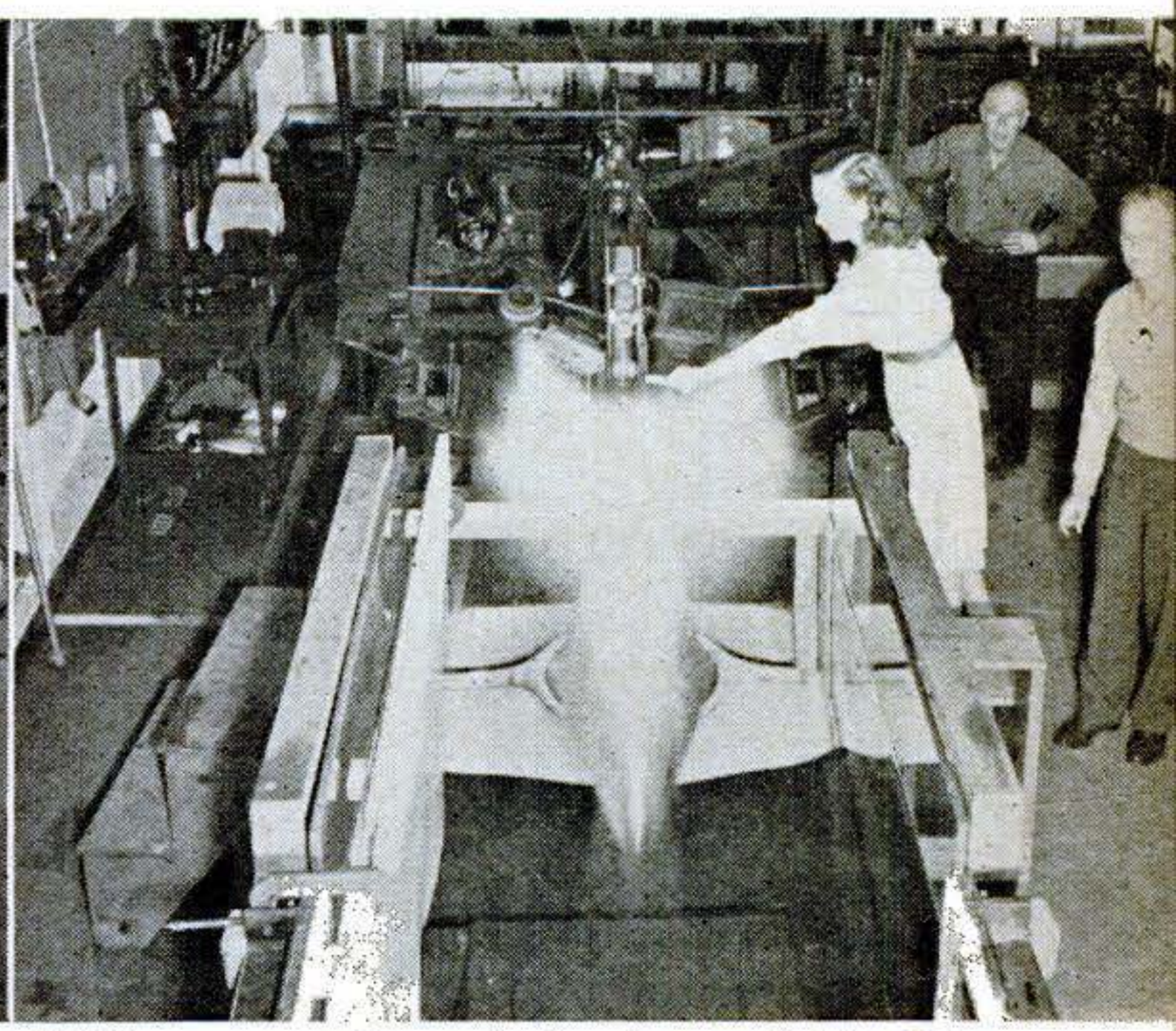
An artificial lake takes the place of the ocean at Morris Dam, in California, where the program is being carried out. There more torpedoes have already been fired than our aircraft launched against Japanese ships during World War II. Almost every conceivable shape for underwater missiles has been tested, and a lot of the complex problems of hydrodynamics—problems concerned with whether a torpedo hits or misses—have been solved.

Miniature test missiles are fired into a laboratory tank by the crossbow method, which permits a variety of speeds and angles. High-speed cameras record their performance in microsecond exposures that show the slightest inaccuracy.

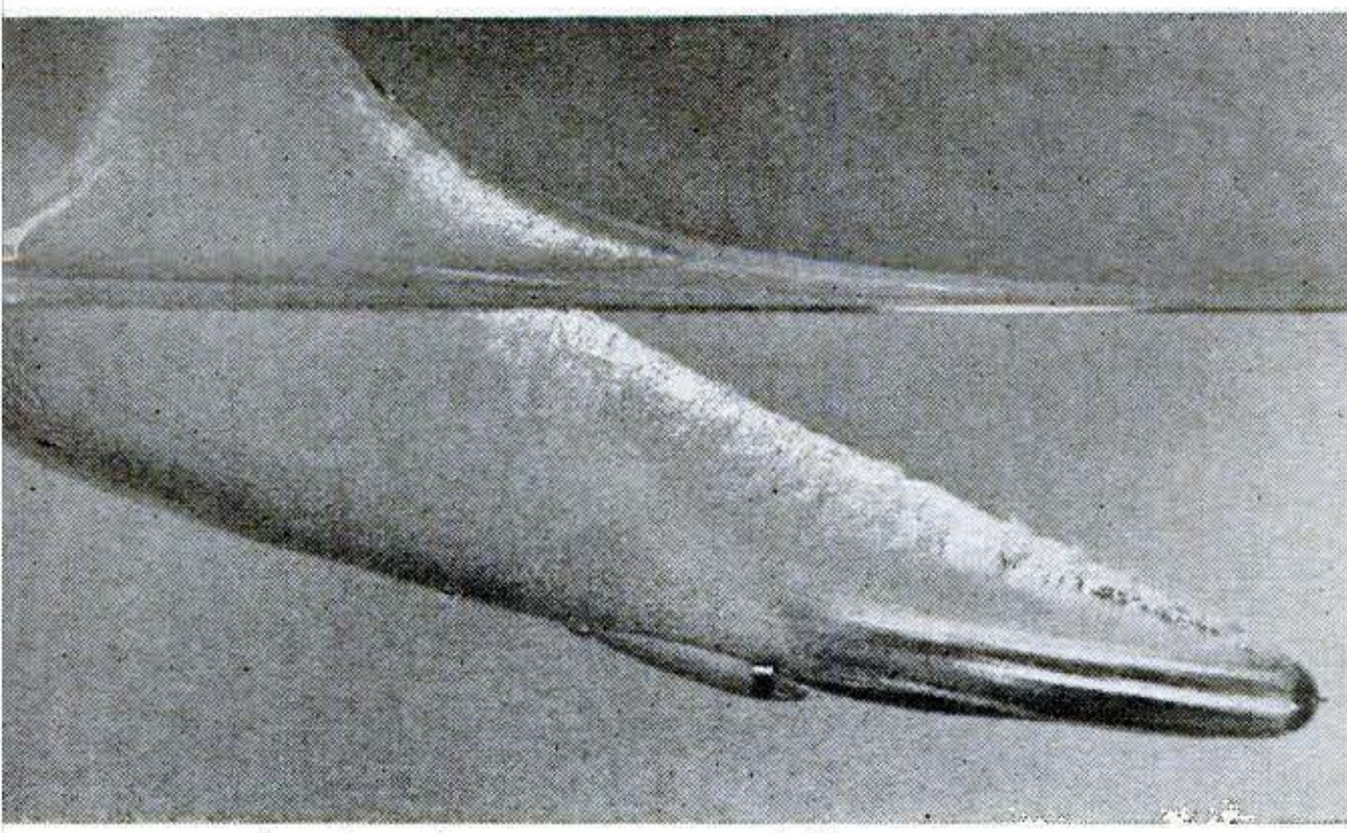
With data gained from the miniatures'



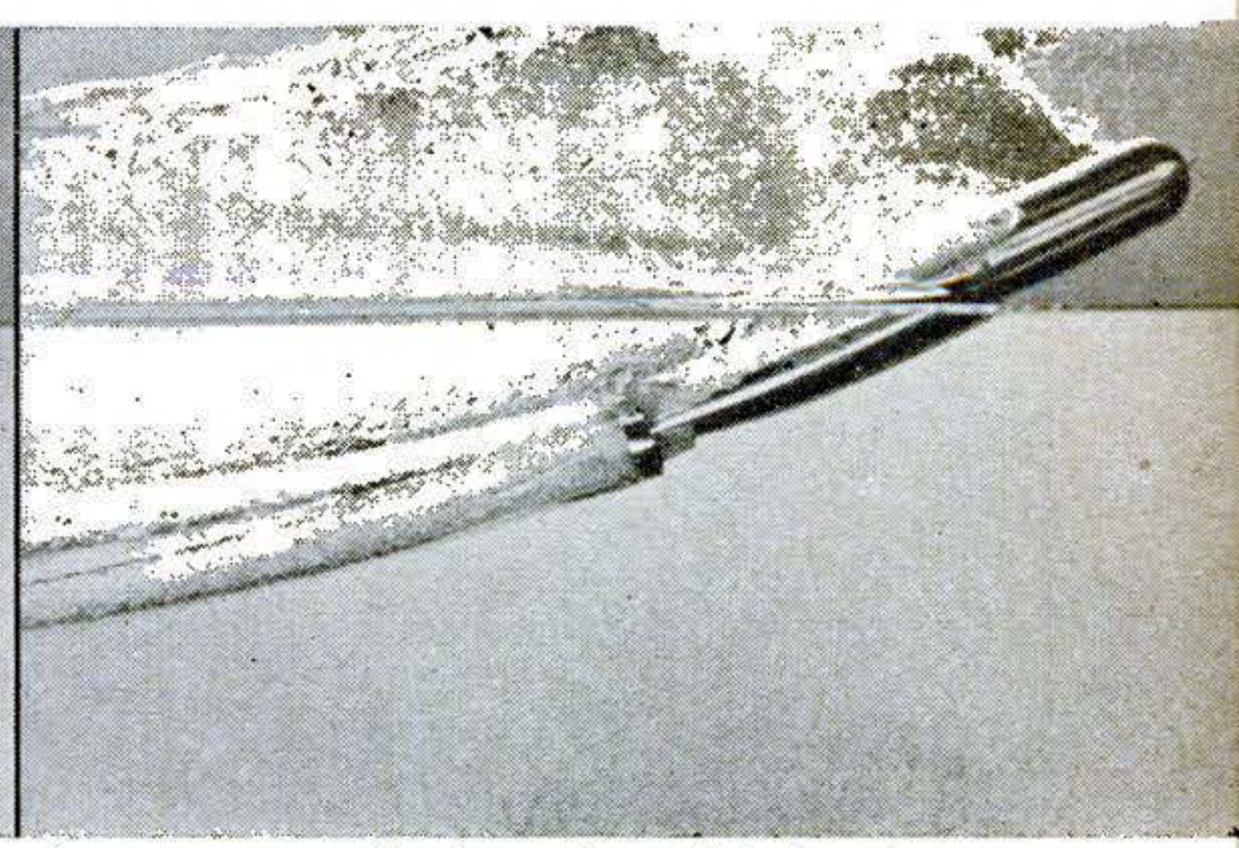
Firing miniature torpedoes instead of arrows, this crossbow mechanism is mounted over tank. Model, ready for firing, is in center channel, at apex of bowstring's shallow, inverted V.



With an oversize splash, the model is driven into water when crossbow is tripped. Cameras around tank record behavior of each model, producing picture sequences like that below.



Angle changes as model continues its course through the tank. The nose rises gradually,

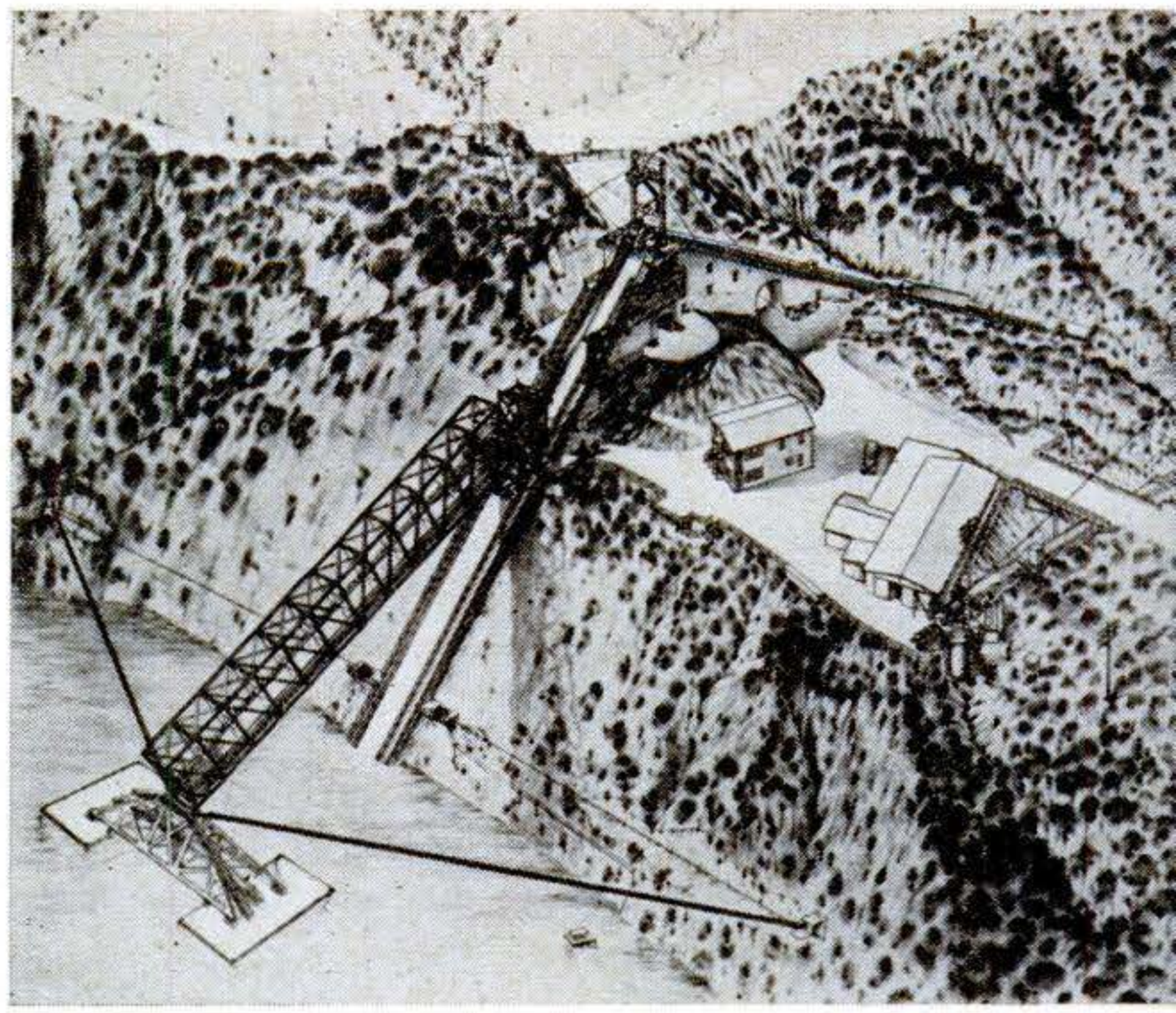


then gets too high—and model breaks water like a playful dolphin at the end of its run.

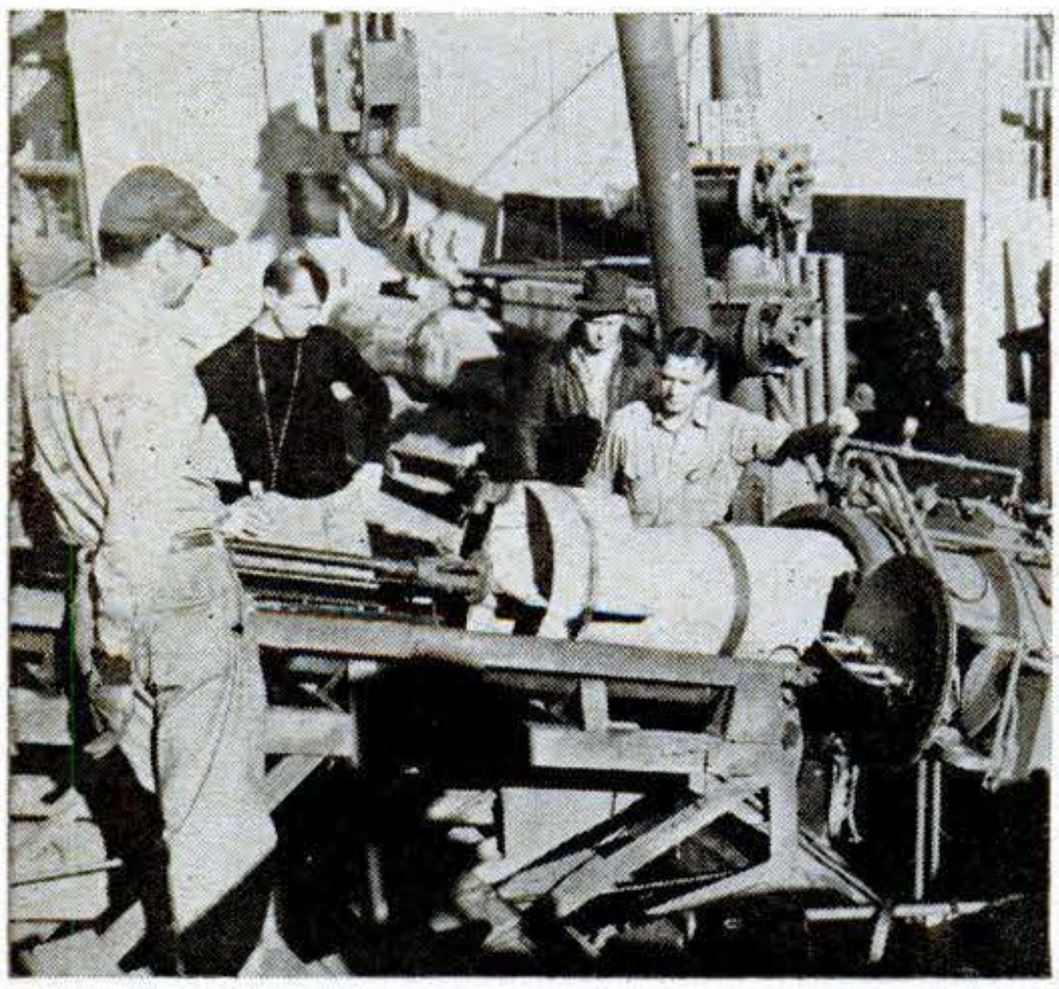
Copyrighted material

behavior, technicians of the Underwater Ordnance Test Range go to work with the "pea shooter"—a compressed-air, fixed-angle launcher. Its 300-foot tube sends full-size torpedoes smashing down a hillside into the lake at speeds rivaling the terrific pace of actual aerial launchings. As with the miniatures, cameras record every test—more than 3,000 since 1943—to catch any inaccuracy or any failure under the tremendous launching impact.

In addition to the fixed-angle system, a variable-angle launcher is now under construction. A multi-tube affair, it will allow test crews to fire torpedoes at angles up to 40°. Sliding up and down on concrete ramps, it will simulate conditions of actual air launchings for more detailed research. END

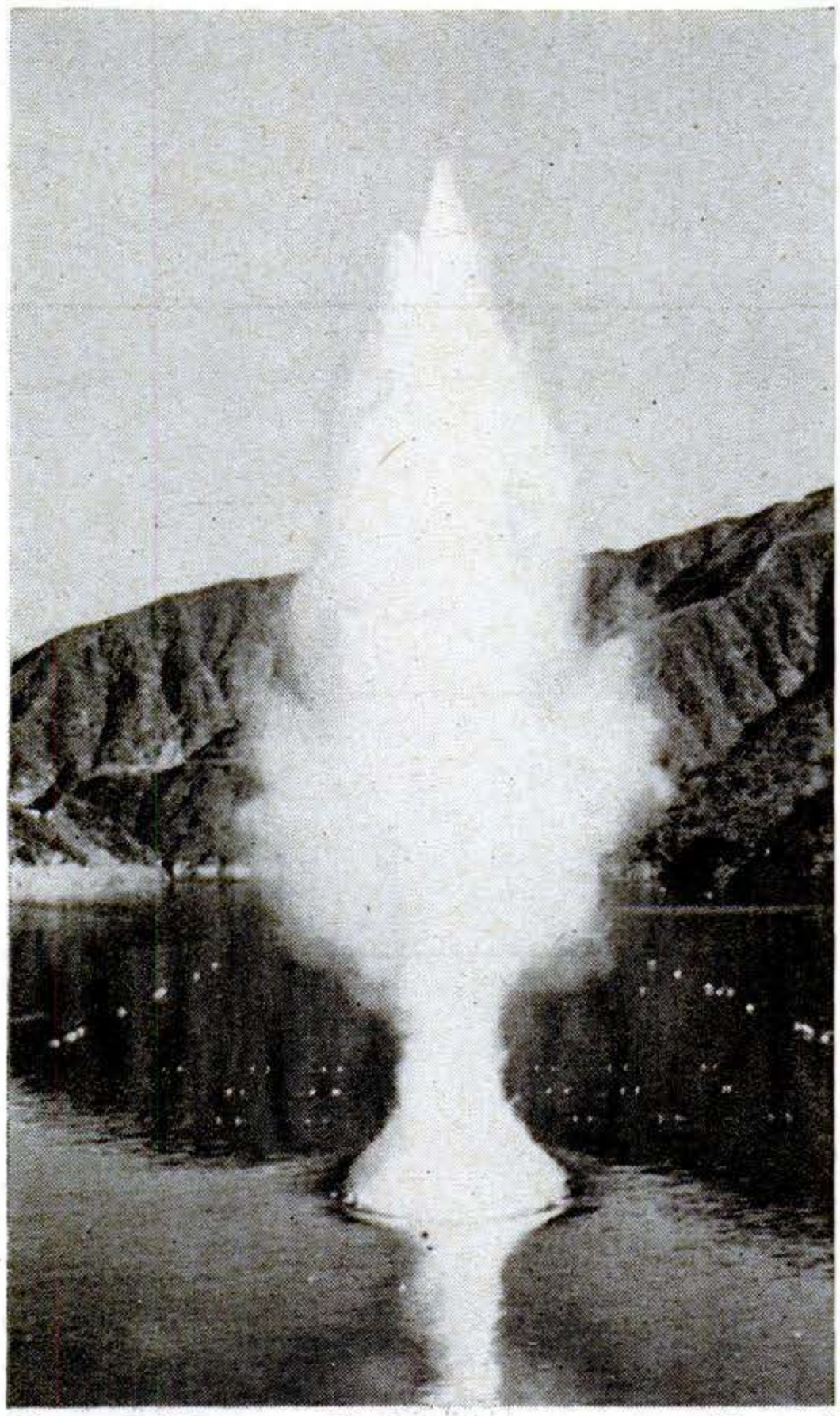


The 300-foot launcher will slide up or down ramps to vary firing angle, while barges at lower end move in and out from shore. Trestle will be largest all-welded structure in U. S.



Full-size torpedo is rammed into breech of the fixed-angle launcher by hand. Once breech is closed, compressed air is fed through maze of tubes to drive missile down hill into lake.

Business end of launcher is suspended over the shore of eight-mile-long lake in Sierra Madre range. Emerging from it, torpedoes hit water as they would if dropped by a plane.



Shaped like a Christmas tree, a pillar of water spouts from lake's surface as one of the big jobs hits the firing range. Picture was taken from directly below the launching tube.

Copyrighted material

Rubber-covered from head to toe, an RAF guinea pig, testing the new inflatable exposure suit, reclines in the water in relative comfort. Upper photo at left shows how the suit rolls up into a "sausage" and fits under the collar of the "Mae West." Lower photo illustrates the ease with which it can be donned even in the cramped quarters of an RAF inflatable dinghy.

Sea Suit Fits Flier's Pocket

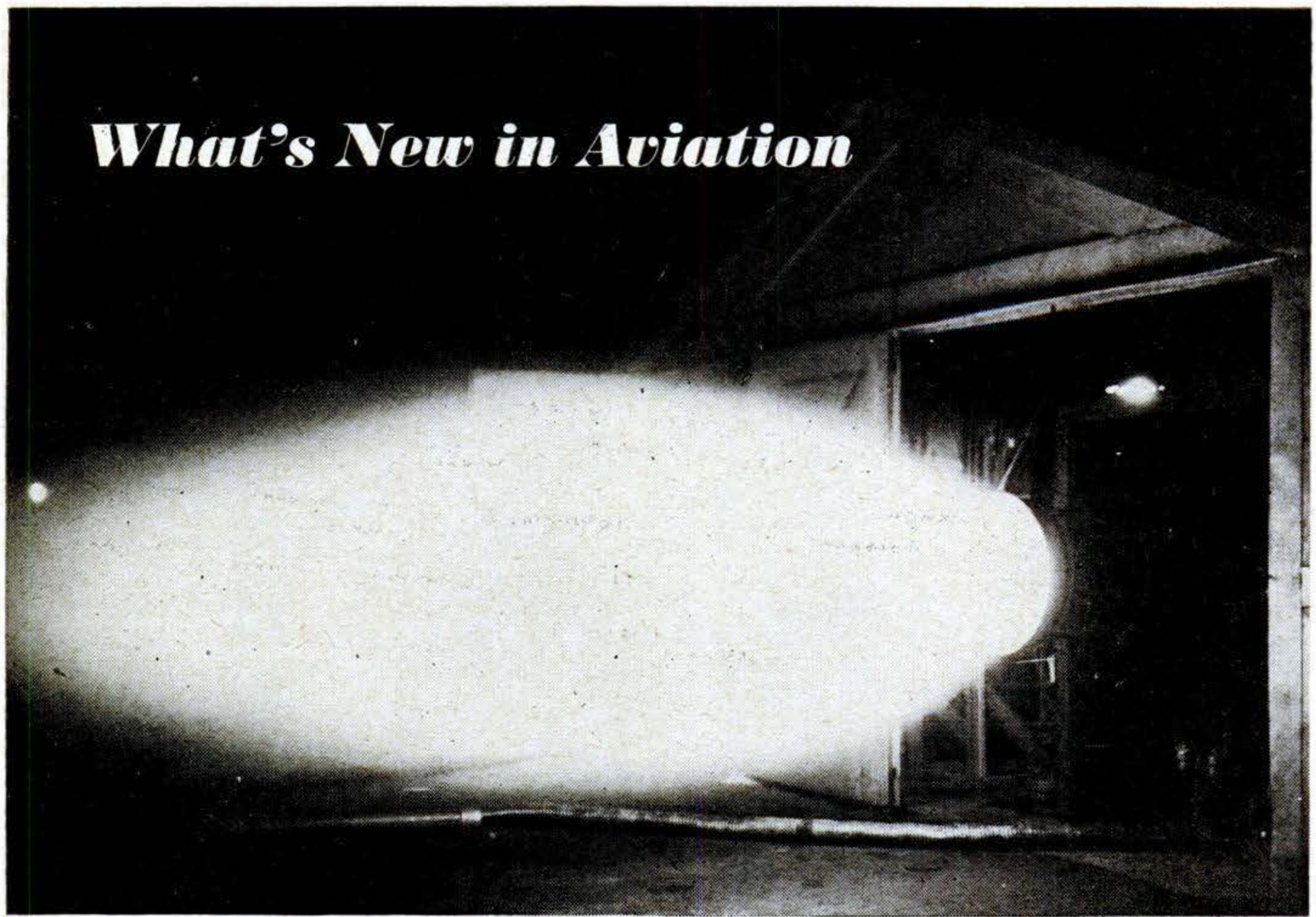
GOOD things come in small packages—at least for British aircrews downed at sea. A lightweight, inflatable suit that can be rolled up and pocketed under the collar of a "Mae West," is the latest effort of the RAF to protect its fliers against exposure in forced landings and crashes at sea.

Consisting of two layers of rubber with air space between, the one-piece suit not only helps keep the wearer afloat but provides air insulation against the cold and damp of icy waters. Folded, it weighs only 2 pounds 12¼ ounces. It is inflated by the wearer after being put on. Now undergoing tests at Farnborough, England, it may become standard equipment for RAF crews.

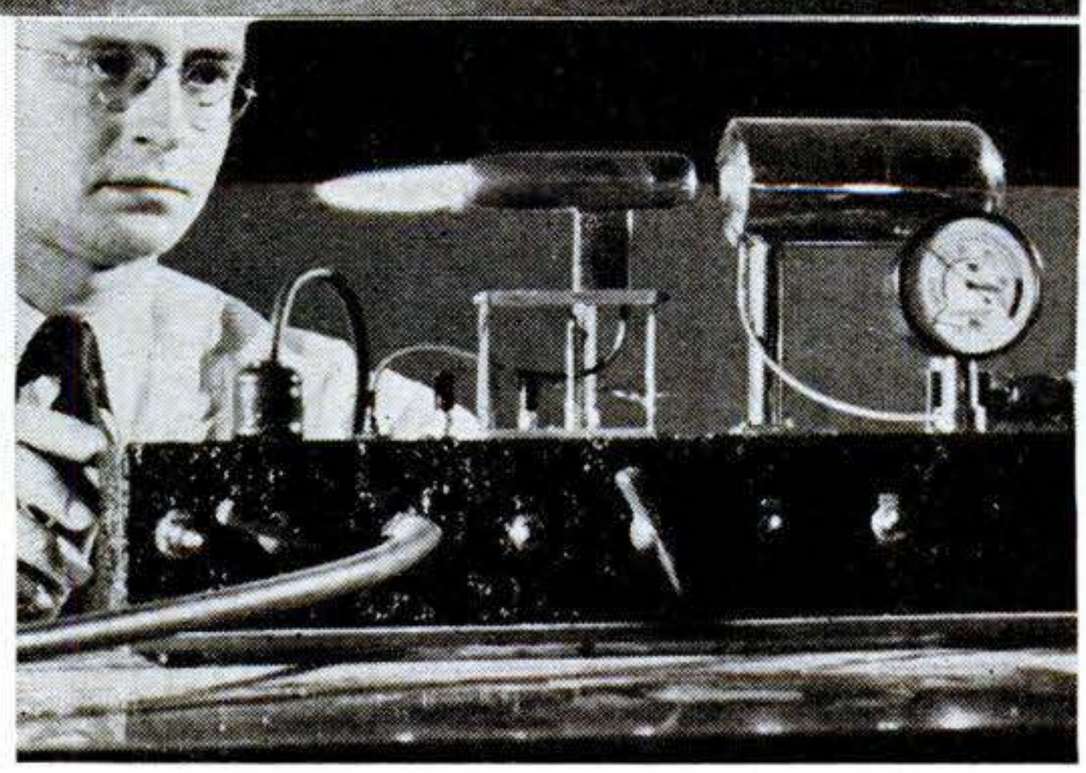
Roomy and flexible, though it makes you look like a rubber mattress, the suit allows free movement, as wearer shows by carrying rubber dinghy.

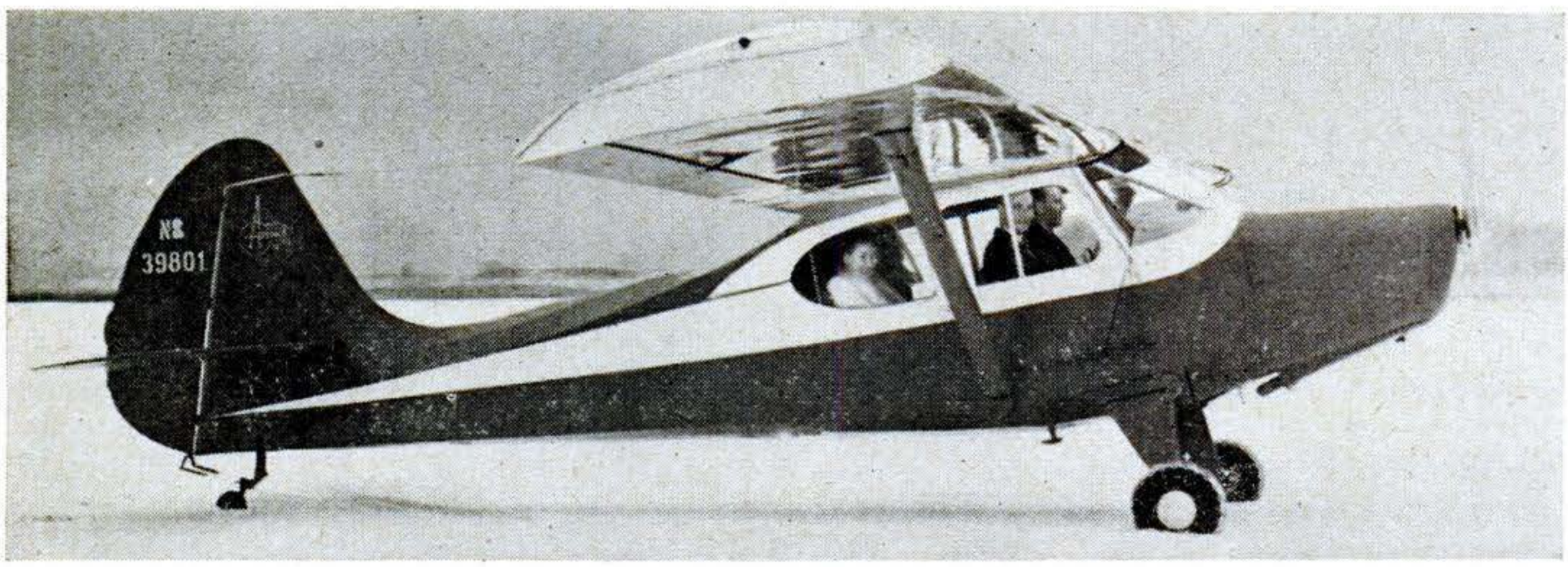
Copyrighted material

What's New in Aviation



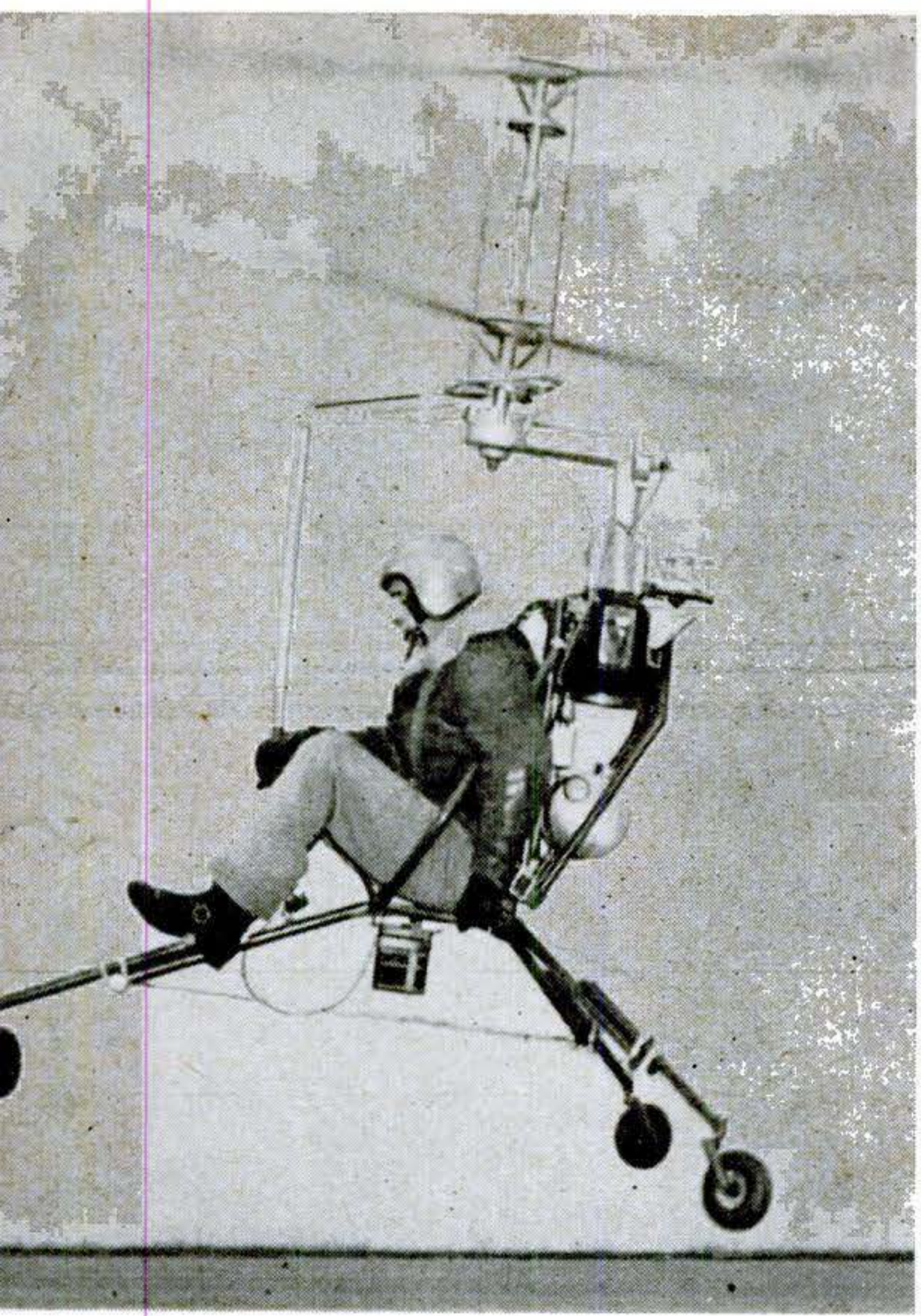
Building Better Jets. The fiery blast shown above is invisible to the naked eye, but infrared film shows what a turbojet afterburner (PS, Oct. '47, p. 82) looks like in action. In this GE test unit, fuel is injected into the tailpipe of a TG-180 to boost its thrust. At right is a less imposing but equally important aspect of jet research: a baby ramjet in the Westinghouse laboratory, spouting its tiny flame in a compressed-air stream—simulating a 375-m.p.h. pace—to help engineers improve jet engines.





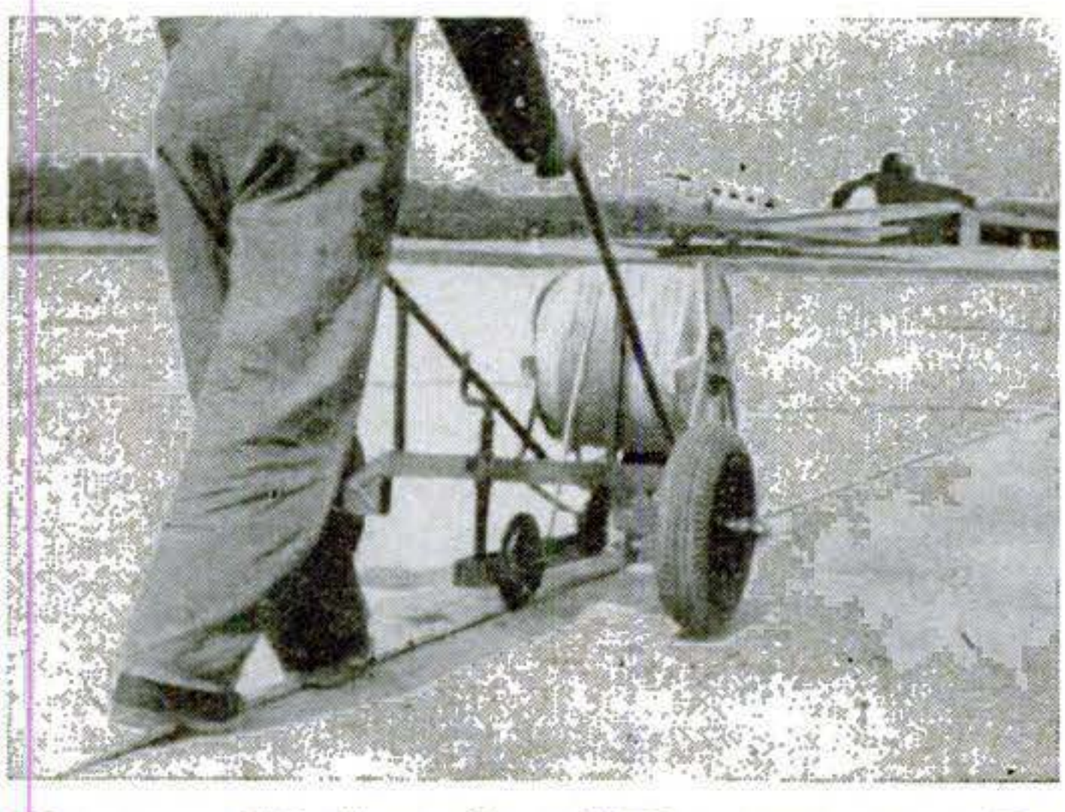
Aeronca for Four. New entry in the lightplane field (where new entries have been scarce lately) is the four-passenger Aeronca Sedan. It has a 145-hp. Continental engine and a top speed of 120 m.p.h. Equipment includes complete night lighting facilities, with twin landing lights (one for glide path, one for taxiing) in the wing.

Copyrighted material



Hoppicopter Sprouts Wheels. The first one-man helicopter built by Horace Pentecost, of Seattle, was a back-pack affair with no landing gear (PS, July '45, p. 68). His latest version (above), now making brief test hops, has tripod gear and even provides a seat for the pilot. The 'copter has a 35-horsepower engine.

Wing Sling Speeds Repairs. A homemade sling devised by a metalsmith at Quonset Point (R. I.) Naval Air Station has outmoded the get-10-men-and-heave method of changing plane wings. Attached to a crane and adjusted to a wing's center of gravity, it allows two men to handle small wings; four men, the big ones.

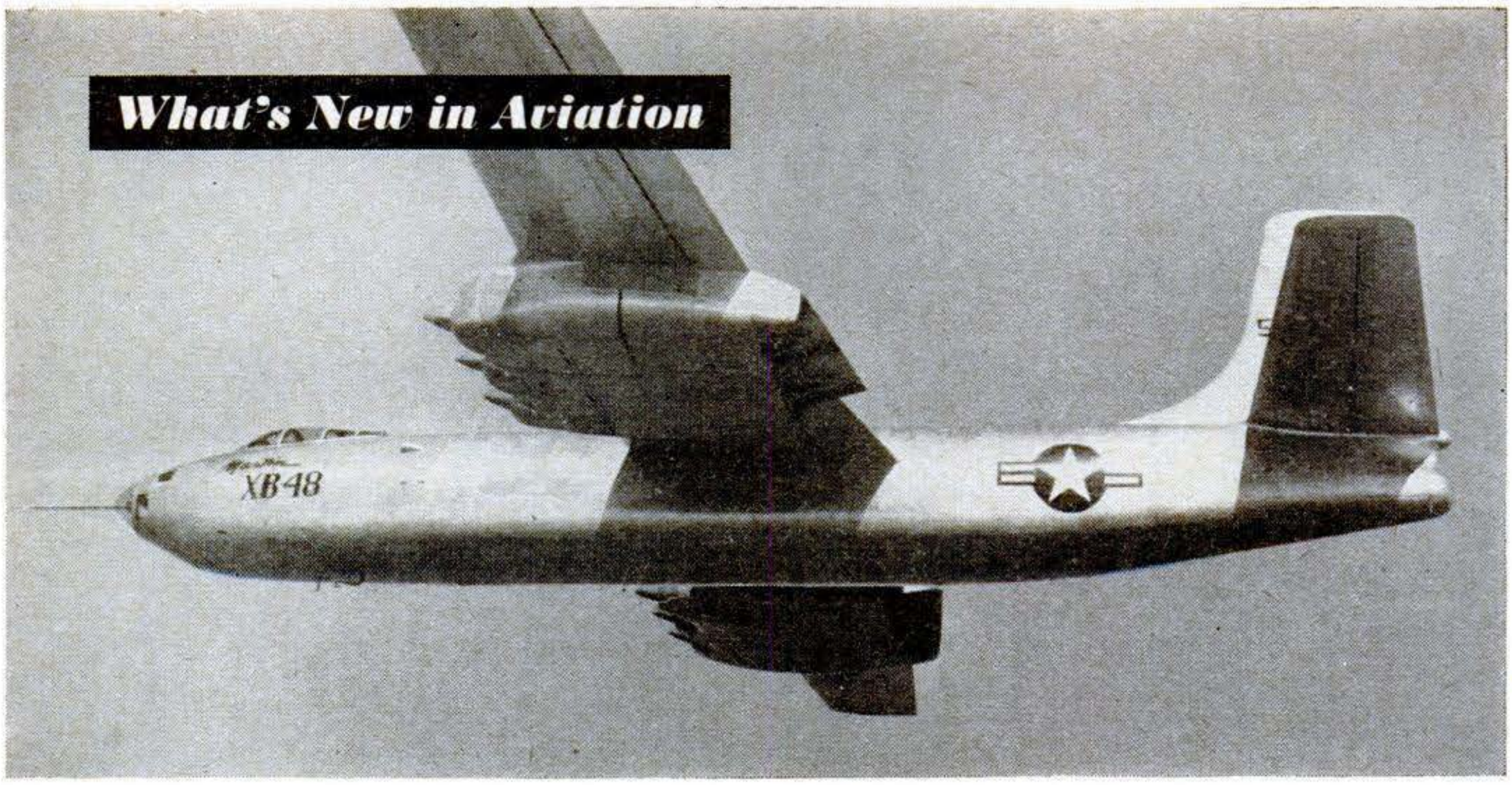


Paper Helps Seal Runways. By rolling a paper-cord filler into runway expansion joints, this device permits the use of new sealing compounds that outdo asphalt.

Playing It Safe. Reports that radar can set off flashbulbs under certain conditions resulted in this canister for air shipment. Metal walls reflect radar waves.

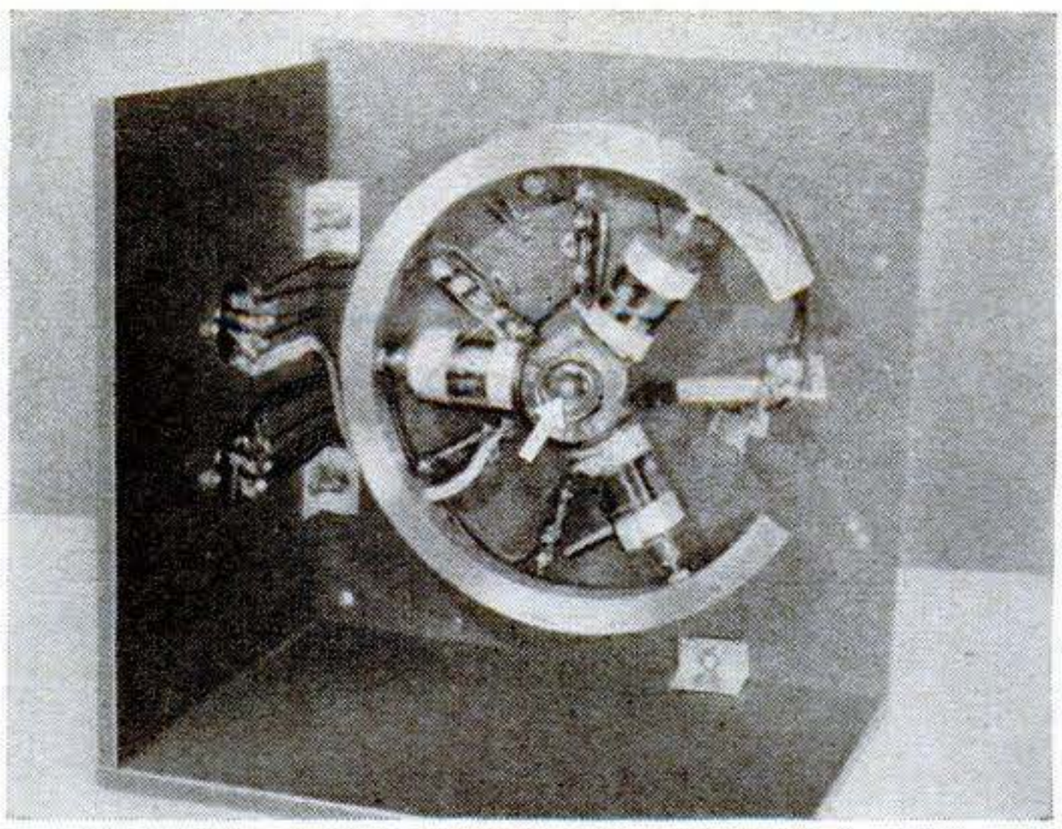
Copyrighted material

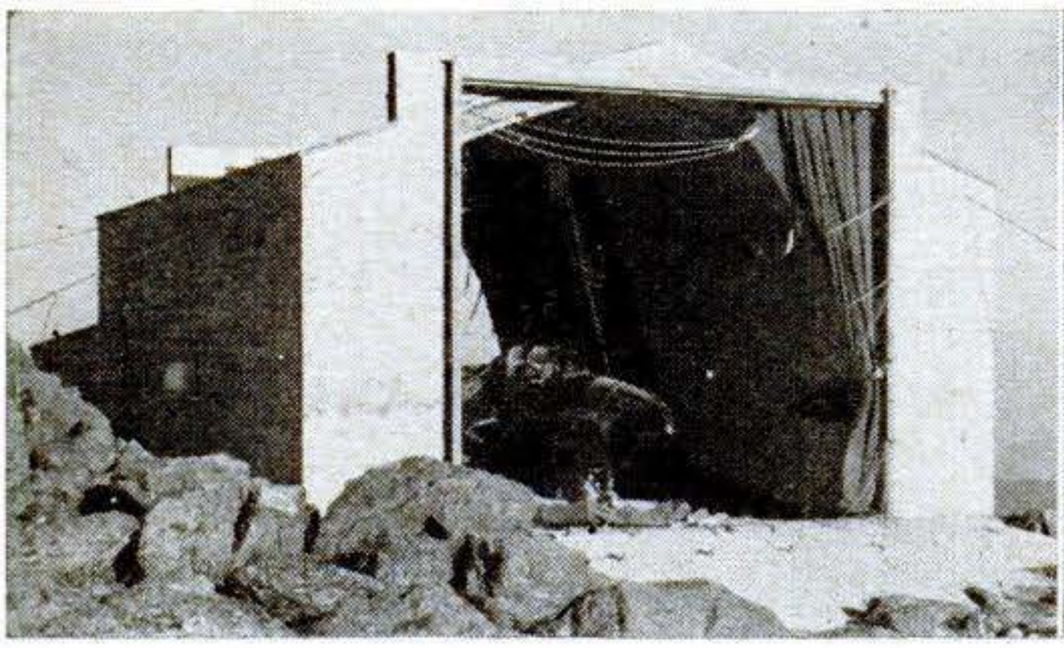
What's New in Aviation

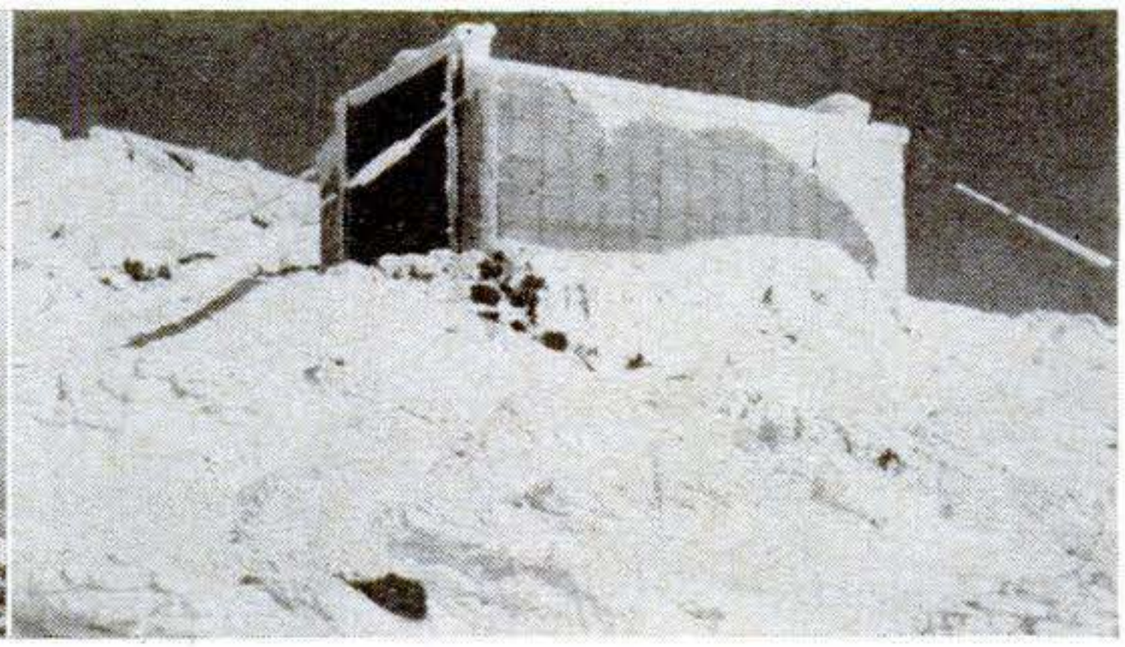


XB-48 Moves Upstairs. Entering the high-altitude phase of its intensive flight-test program, the six-jet Martin XB-48 posed for this aerial portrait over Chesapeake Bay. The second of the big bombers (whose box-mounted engines turn out a total of 24,000 pounds' thrust to lug a 10-ton bomb load) is nearing completion.

Super Top Tests Paint. To test adhesive qualities of paint for high-speed aircraft, Navy researchers spin a quarter-inch steel ball (arrow) up to 2,400,000 r.p.m. in the ultracentrifuge at right. A dot of paint is put on the ball, which is then magnetically suspended in a vacuum and driven by a rotating magnetic field. Speed is increased until centrifugal force rips off the paint; at top speed, the ball's surface travels about 1,800 m.p.h. Top of ball is flattened to keep it on a constant axis, and it's so friction-free that it will go on spinning for a week after the power is cut off.

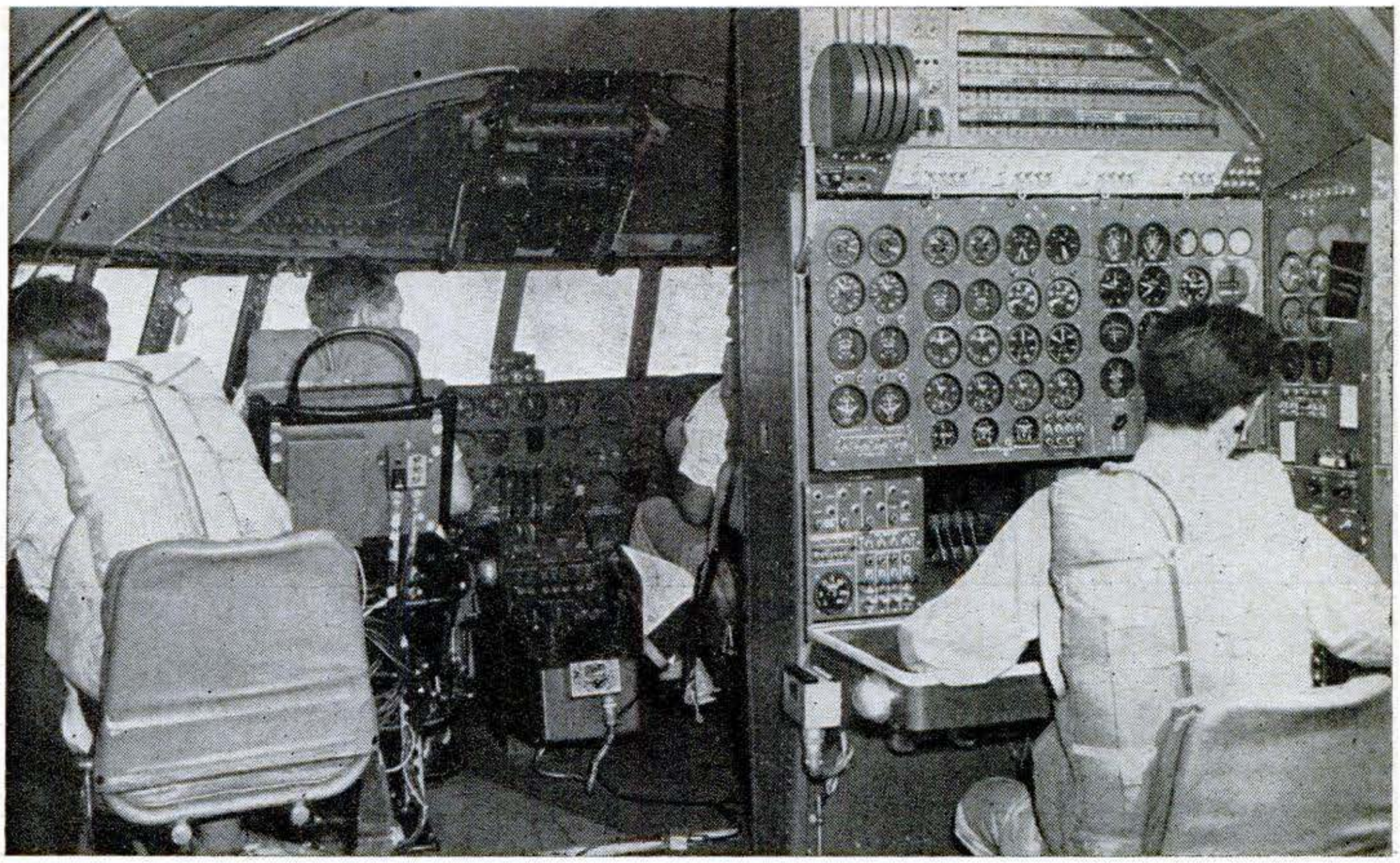




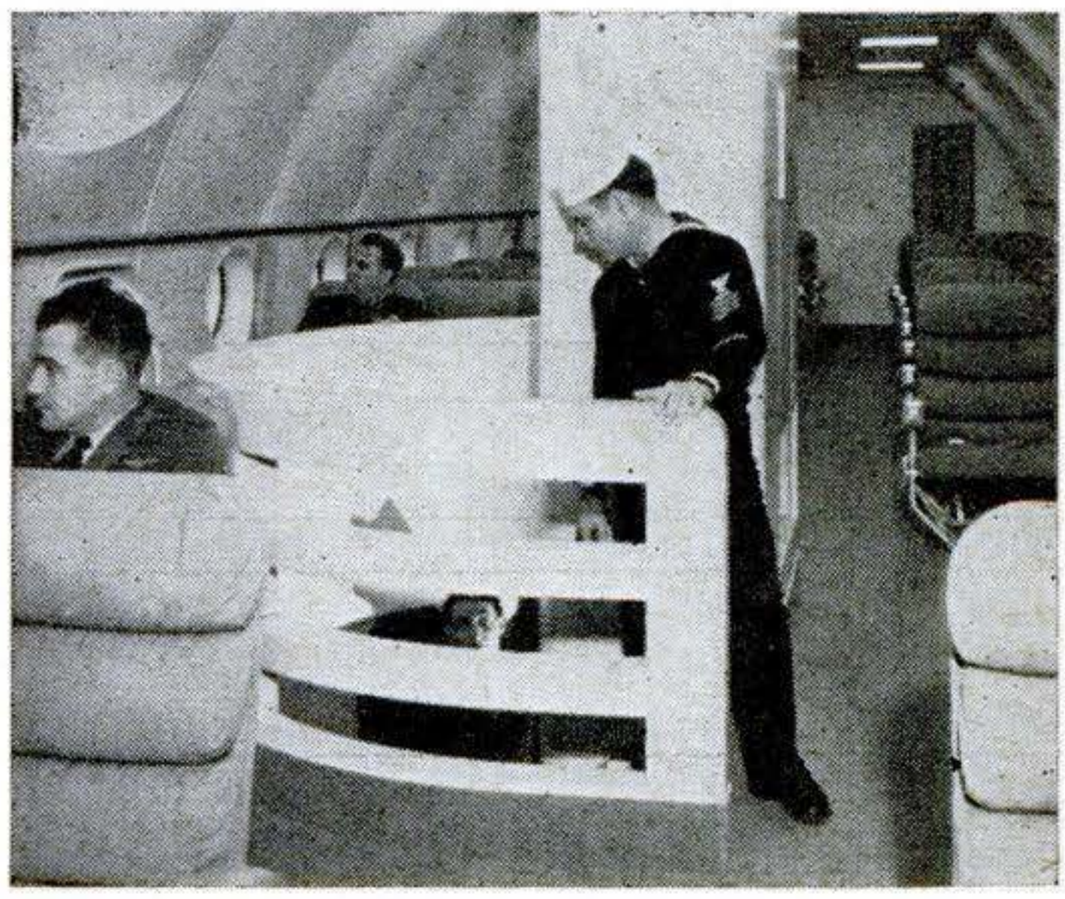


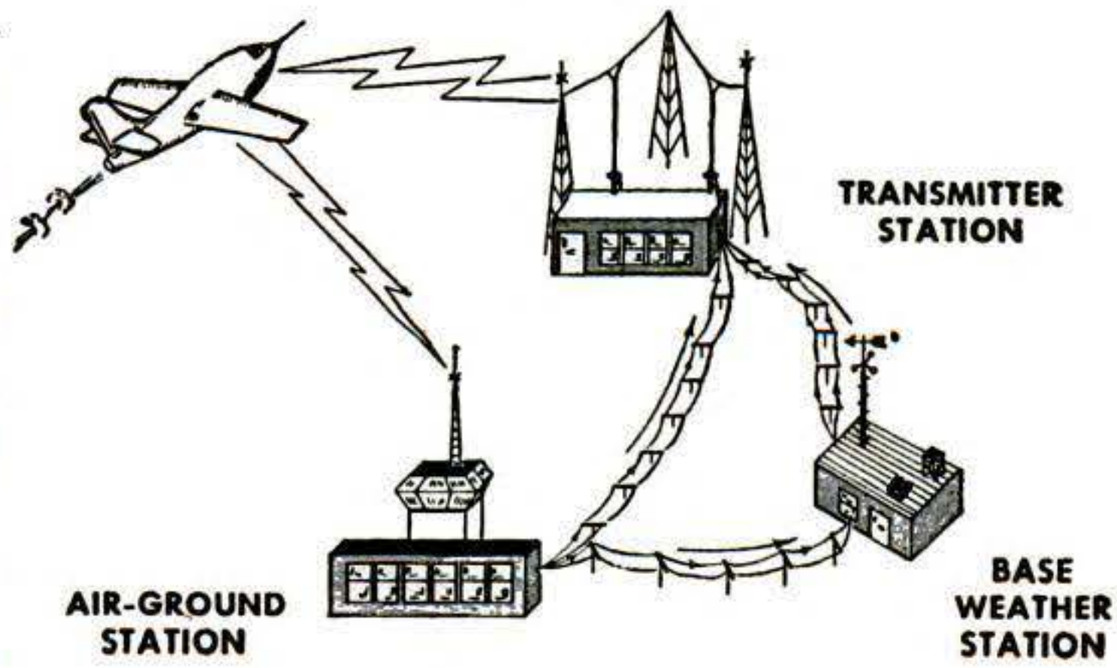
Mountain-Top Icing Lab. In frigid gales atop Mt. Washington, N. H., Navy technicians have been learning about icing hazards for jet planes. A McDonnell Phantom, visible at left, above, was trucked up the peak and housed in a hangar built to stand 200-m.p.h. winds and heavy snow like that pictured on the right. In winter-long tests, research crews found that ice forming on intake vanes can cut off a jet engine's air supply. As a result, new anti-icing systems are now being developed.

Copyrighted material



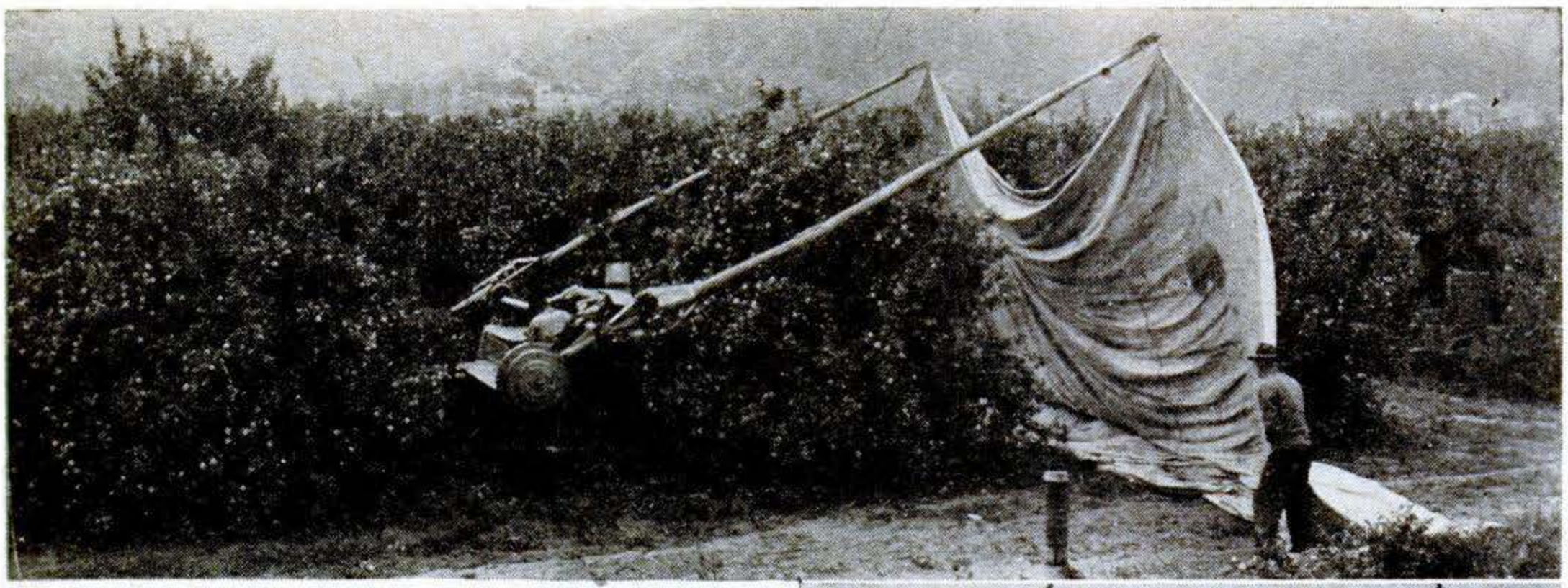
Constitution Close-Ups. Getting ready to go to work, the 180-passenger Constitution (PS, Nov. '46, p. 89) shows off its interior. View of the flight deck, above, shows how pilots and flight engineer (in right foreground) share the work of flying the Navy's biggest transport. Engineer handles all engine controls except during landings and take-offs, and an assistant takes care of electrical controls. At right is the rear part of the transport's spacious upper deck. Spiral stairway leads to lower deck, which can be used for either passengers or cargo. Four 3,500-hp. Wasp Major engines power the big air liner.





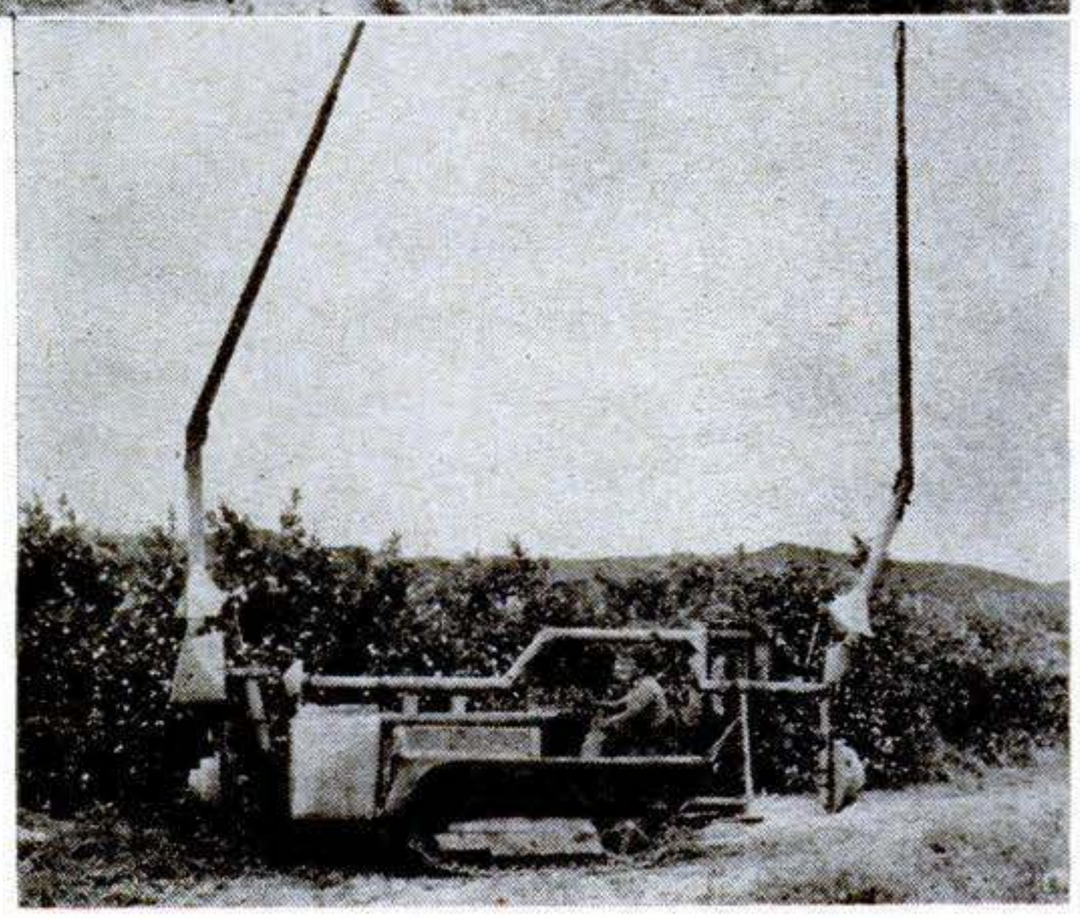
Weather Won't Wait. And neither will high-speed, fuel-gulping jet planes, which can't stand by aloft while a weather forecast goes through a time-killing series of relay operations. So the U. S. Air Force has developed a radio-telephone system that puts jet pilots in direct contact with weather forecasters. As illustrated in the drawing, above, the system hooks a weather station into the normal air-to-ground radio network when a forecast is required. It is being tested at three Air Force bases.

Copyrighted material



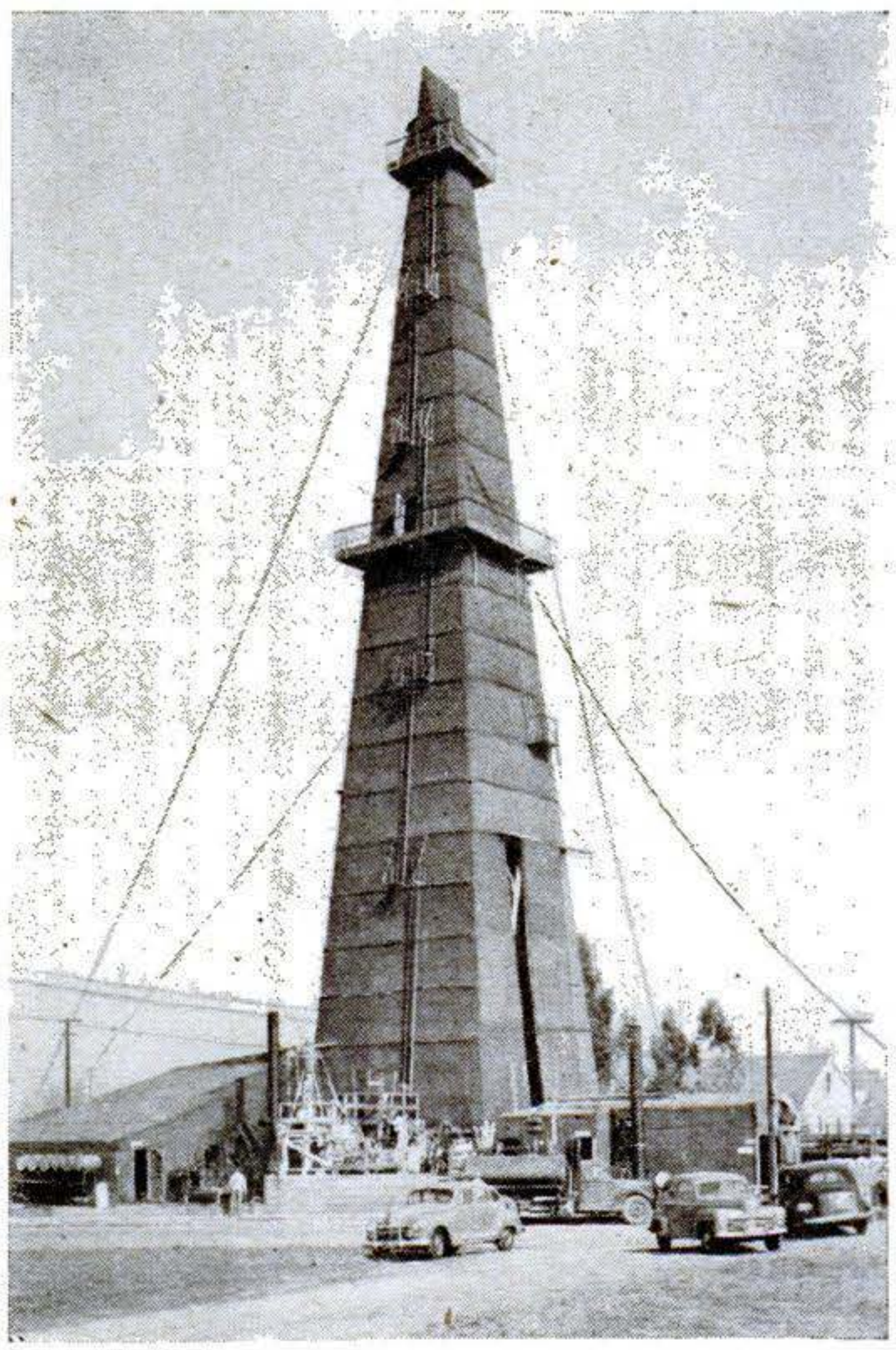
Trees Covered Quickly

CALIFORNIA fruit growers have mechanized the tedious job of spreading canvas fumigating tents over trees. Twin tubular-steel arms are attached to the ends of a tractor, as shown at right. The arms are lowered around a tree by a gear arrangement, and the canvas is hitched on. The arms are then raised, pulling the canvas over the branches in a single operation, as shown above. One tent puller can cover 100 trees an hour. Another type, mounted on a truck, has arms joined in a wide curve and moved by gears attached to the piston of an hydraulic cylinder.



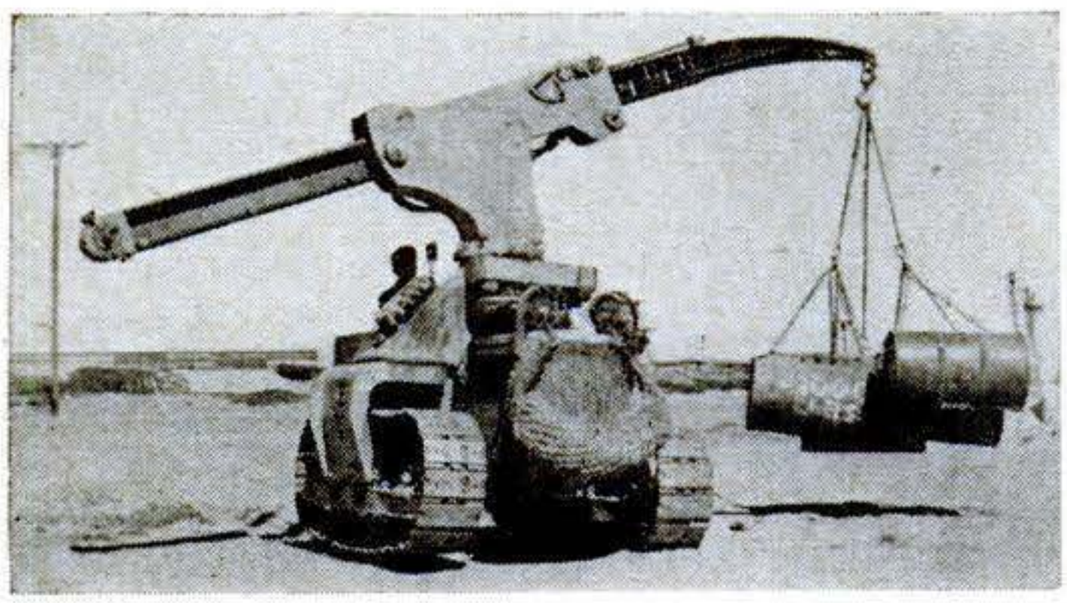
Rig in a Blanket

WHEN clanking machinery kept the neighbors awake, the General Petroleum Corp., of Los Angeles, wrapped this derrick (right) in a blanket of rock wool. It cut the noise to one-fifth. Insulation is in a series of horizontal panels covering the rig.

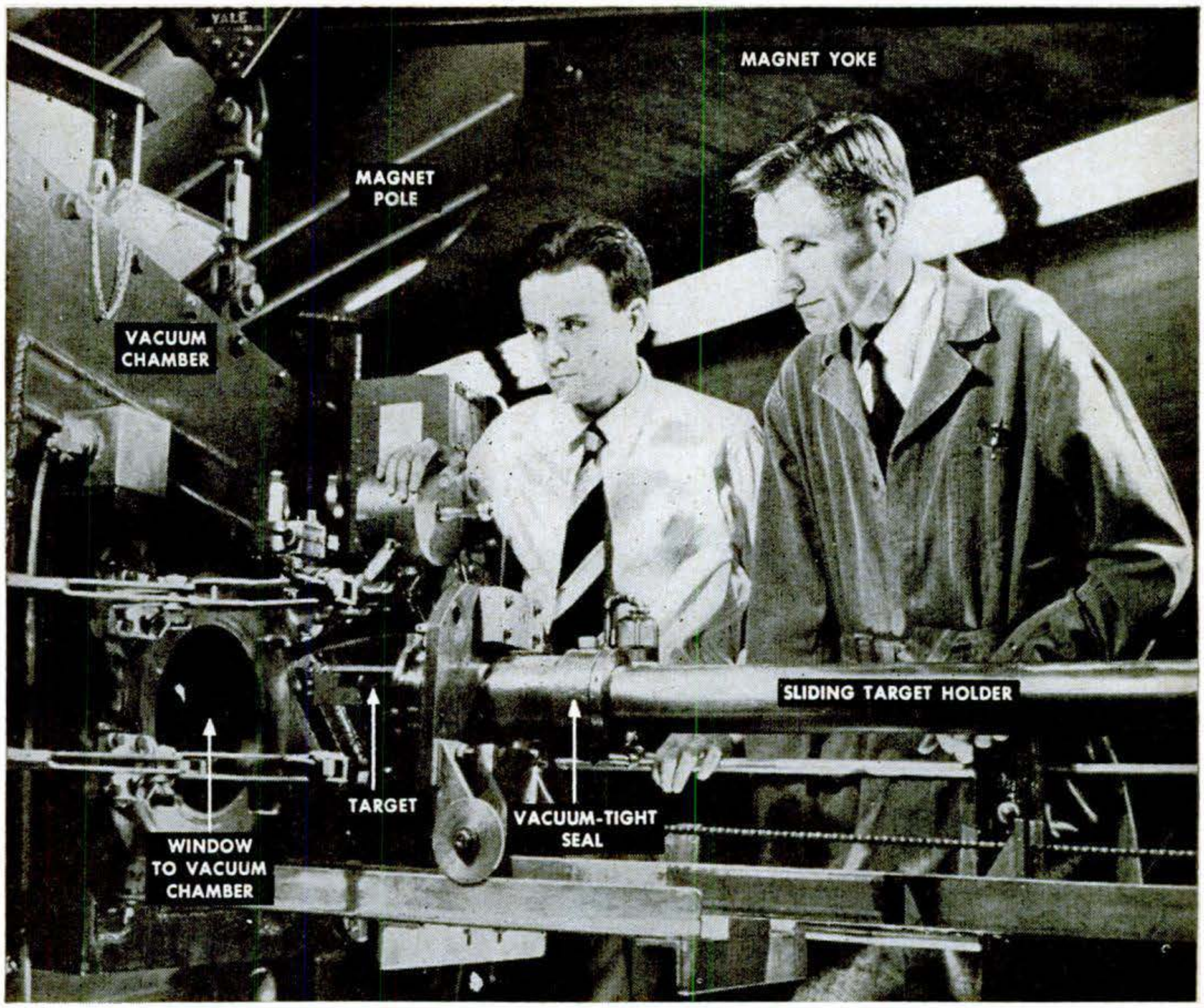


Aids Beach Loading

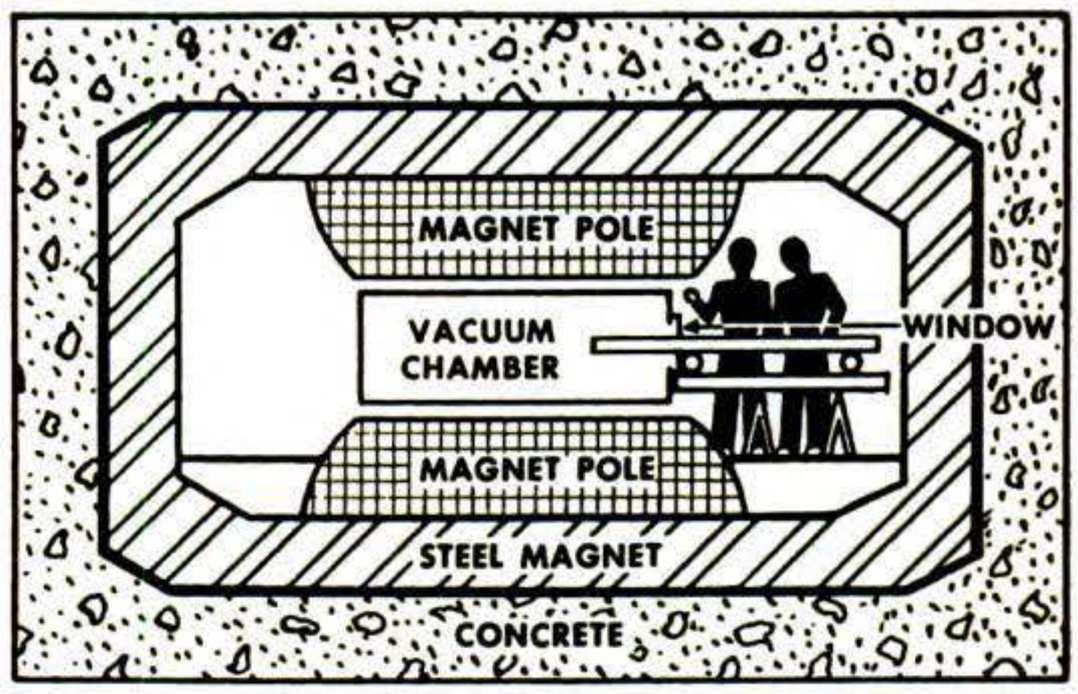
THE combination crane-tractor shown below is designed to help Seabees load and unload cargoes on sandy beaches. The movable arm picks up heavy loads and deposits them 20 or more feet away. It is made by Austin Western Co., Aurora, Ill.



Copyrighted material



Drs. Lattes (left) and Gardner set the target before placing it inside cyclotron. These two young physicists created the first man-made meson after many previous attempts had failed.



Sketch above shows how scientists in top photo are standing actually inside part of cyclotron. They are next to vacuum chamber, with magnet yoke visible behind them and pole at upper left.

Man Makes Matter

MATTER has been made out of pure energy in a cyclotron by two young scientists at the University of California. They fired 380,000,000-electron-volt alpha particles (the hearts of helium atoms) at targets of copper, carbon, and beryllium. After the collision, new invisible particles appeared inside the cyclotron.

These particles got their weight, 313 times that of an electron, from the speed energy of the protons in the "bullet." Where before there had been one fast and one slow particle, there were now three particles weighing more than the two original ones.

These particles are mesons, found previously in cosmic rays. Mesons may be the clue to many mysteries, such as nuclear binding energies. These strange, gravity-like forces, which hold the atomic nucleus together, are tremendous (PS, Jan. '48, p.113). If they can be released profitably they will make today's uranium pile look like Watt's original steam engine.

The mesons were produced by Dr. Cesare M. G. Lattes, of the University of Sao Paulo, Brazil, and Dr. Eugene Gardner, researcher in California's Berkeley Radiation Lab.

Copyrighted material

Wide, low-pressure tires spread weight over a large area, help JBC navigate mud or swamps.

Jungle Buggy Packs a Load

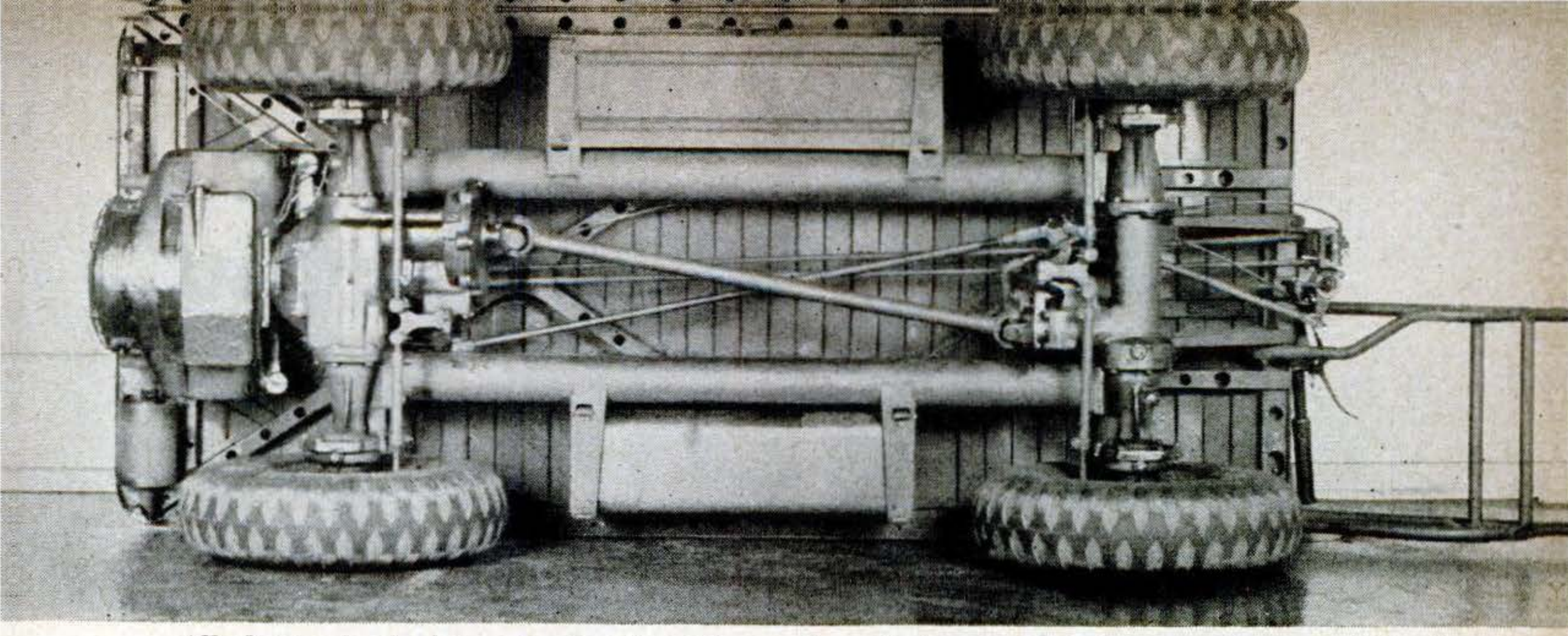
A PINT-SIZE jungle buggy, as versatile as it is small, is the latest addition to the motorized equipment of U. S. armed forces. Known as the JBC (Jungle Burden Carrier), it can carry half again as much as its own weight, and can go places that might drive a mule mad.

Designed by Willys-Overland, this baby brother of the Jeep was originally planned as a litter carrier near the end of World War II. Field tests at Eglin Field, Fla., however, proved it equally valuable for carrying supplies and men over rough ground. Four-wheel drive, four-wheel brakes, and four-wheel steering, plus a tricky tiller arrangement, allow it to get around with ease whether roads exist or not.

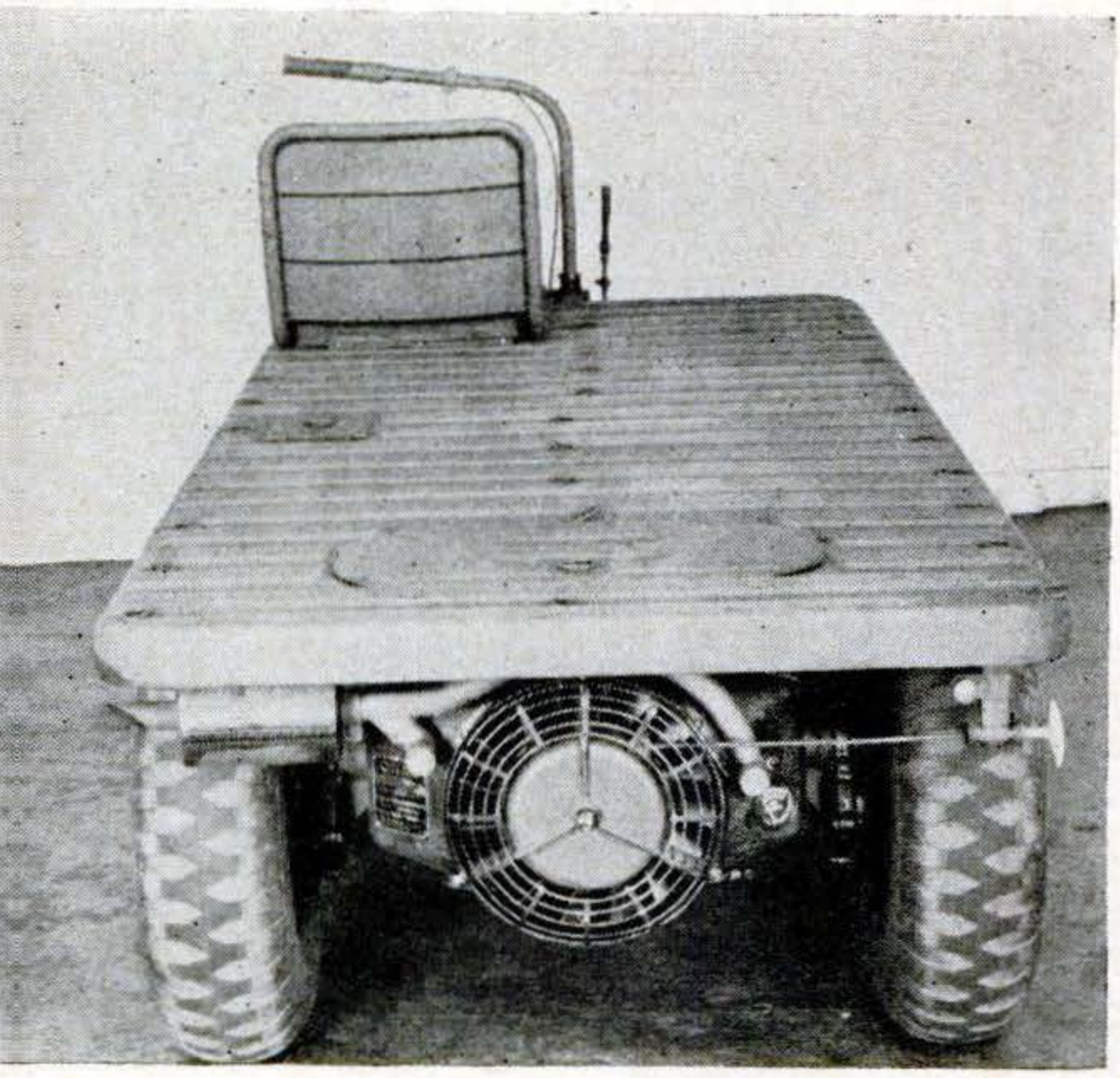
Powered by a nine-horsepower, two-cylinder engine, the JBC is a mobile platform standing about two feet high. Fully fueled, it weighs only 550 pounds and can carry a useful load of 800 pounds. With three speeds forward and one reverse, it climbs 43 percent grades in low gear and does about 27 m.p.h. in high. Tires are 6.50 x 10 and carry only 7½ pounds' pressure, giving the JBC good footing for soft going. Its turning radius is only 9½ feet.

The driver of a JBC has a novel choice: he can ride in the single seat or he can walk, as his fancy or the terrain dictates. The steering tiller has a motorcycle-type accelerator in its handle and can be swung through a 180° arc. By setting it in one of four positions, the driver can leave his seat and walk on either side of the vehicle, in front of it, or behind it when it's in reverse. A hand brake beside the tiller guards against the JBC's running away and leaving its pedestrian driver.

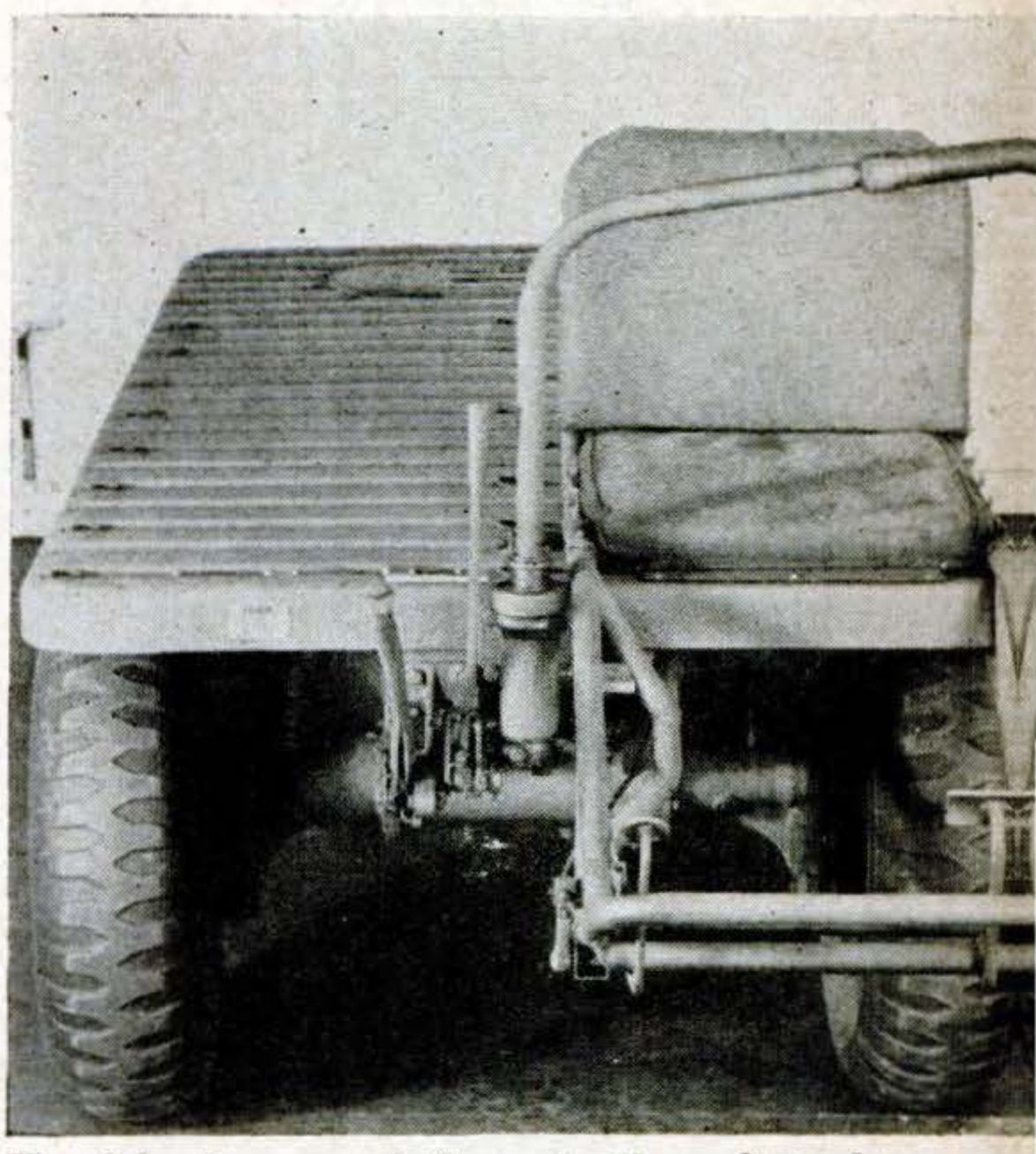
Copyrighted material



All four wheels have steering knuckles, and front and rear tie rods are interconnected. Since wheels are small, drive shaft to front wheels is offset upwards to increase clearance. Wheelbase is 54 inches, tread 31½ inches. Not counting the footrest, length of the JBC is 85 inches.

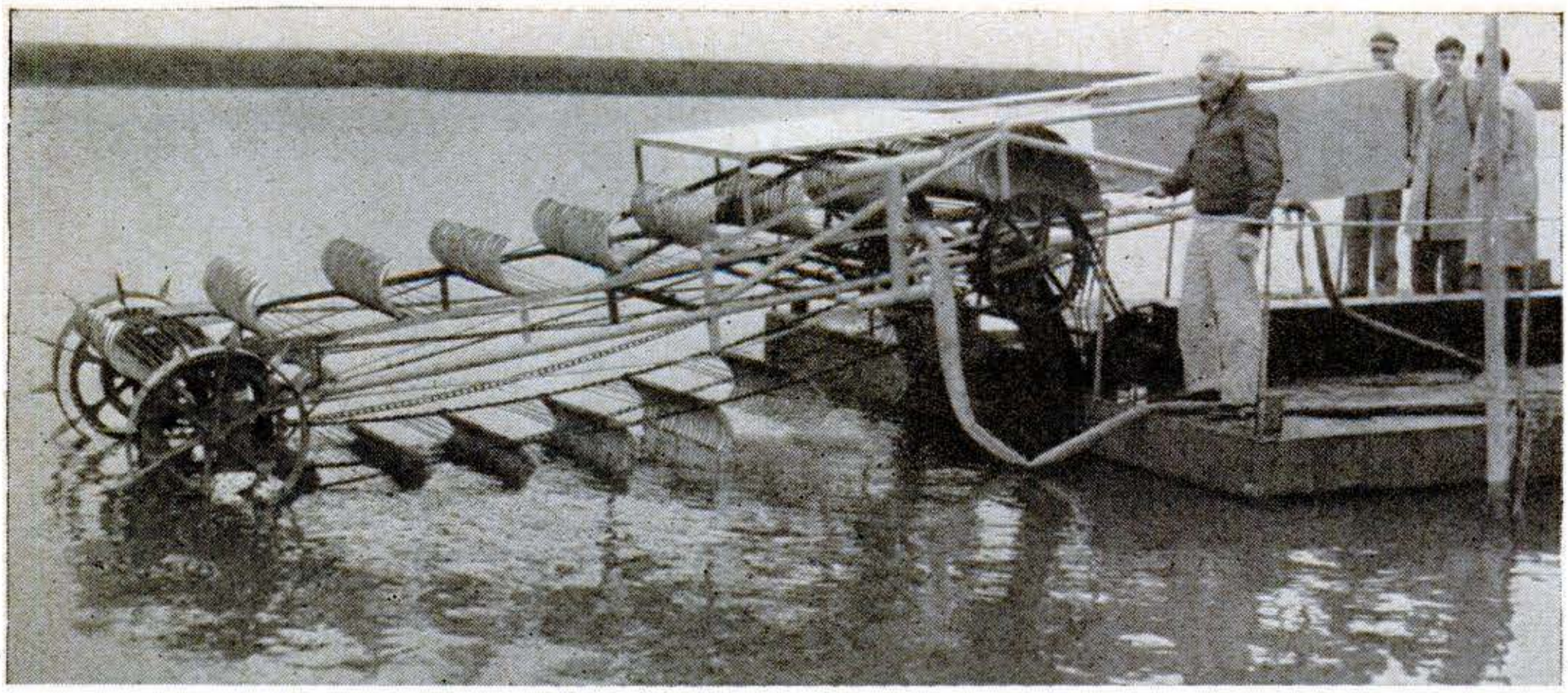


Rear-mounted engine is air-cooled, its two cylinders horizontally opposed. Handle at right is starter cable, like those on outboard motors.

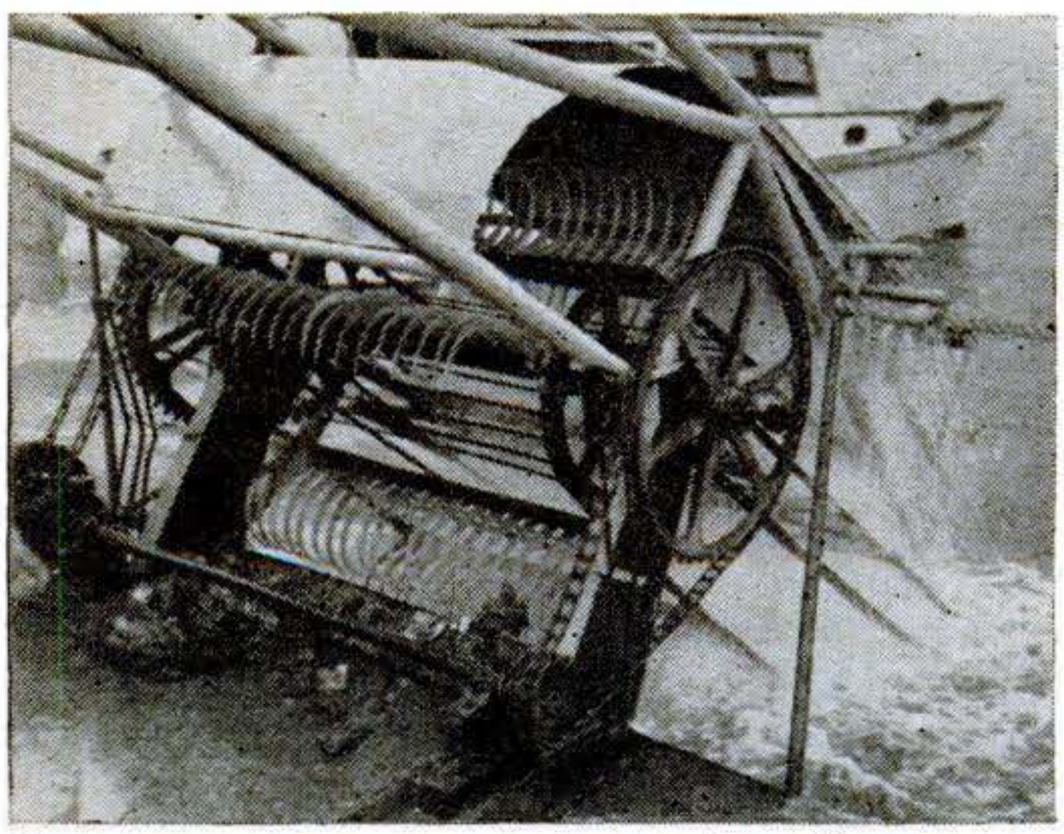


Hand brake, gearshift, and tiller adjoin driver's seat. JBC has foot brake, and a foot throttle besides hand accelerator on the tiller.

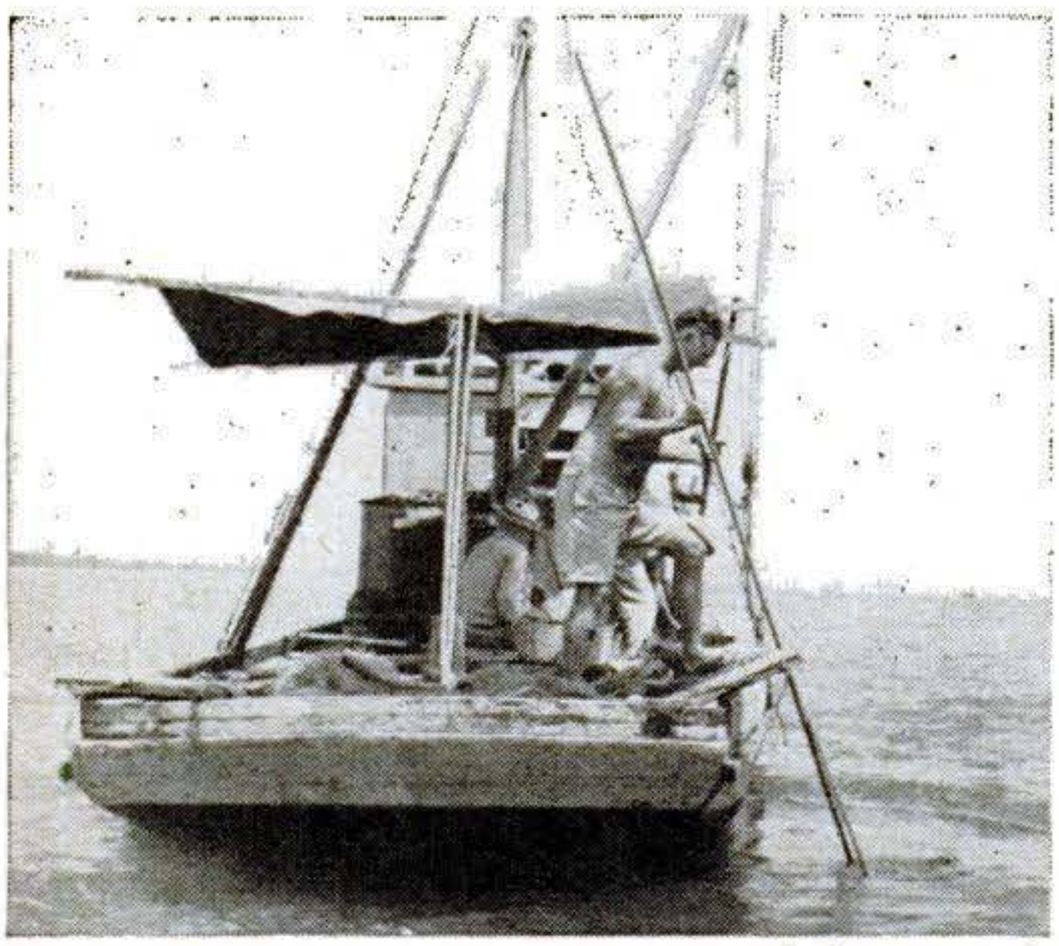
Load is tied down to the bed with straps that buckle into metal loops. Here, using reverse gear with tiller swung out, driver steers the vehicle up a hill from behind. This lightens the load and, under fire, would keep driver from being a sitting duck on exposed seat.



Filling counterbalance tank above barge's hull raises harvester's chain-driven conveyer belt and twin tractor wheels for shallow-draft work. Wheels turn one way to pull barge forward, and belt turns the other way, so prongs scrape along bottom in the direction barge is moving.



Swinging up over pivot point from deep-water position, prongs (and oysters, if any) pass through cleansing jets. Prongs are set about 1½ inches apart; belt has 19 rows of them.



Old-fashioned tongs may not match harvester's pace, but are still widely used. They resemble two long rakes with handles hinged to bring tines together and pinch oysters off bottom.

The Oyster Hoister's Here

PLOWING through Louisiana bayous like a seagoing hay rake, a mechanical fisherman has added something new to the oyster industry. It is an automatic harvester—instantly known as the "Oyster Hoister"—that can prong maybe 100 bushels of oysters an hour.

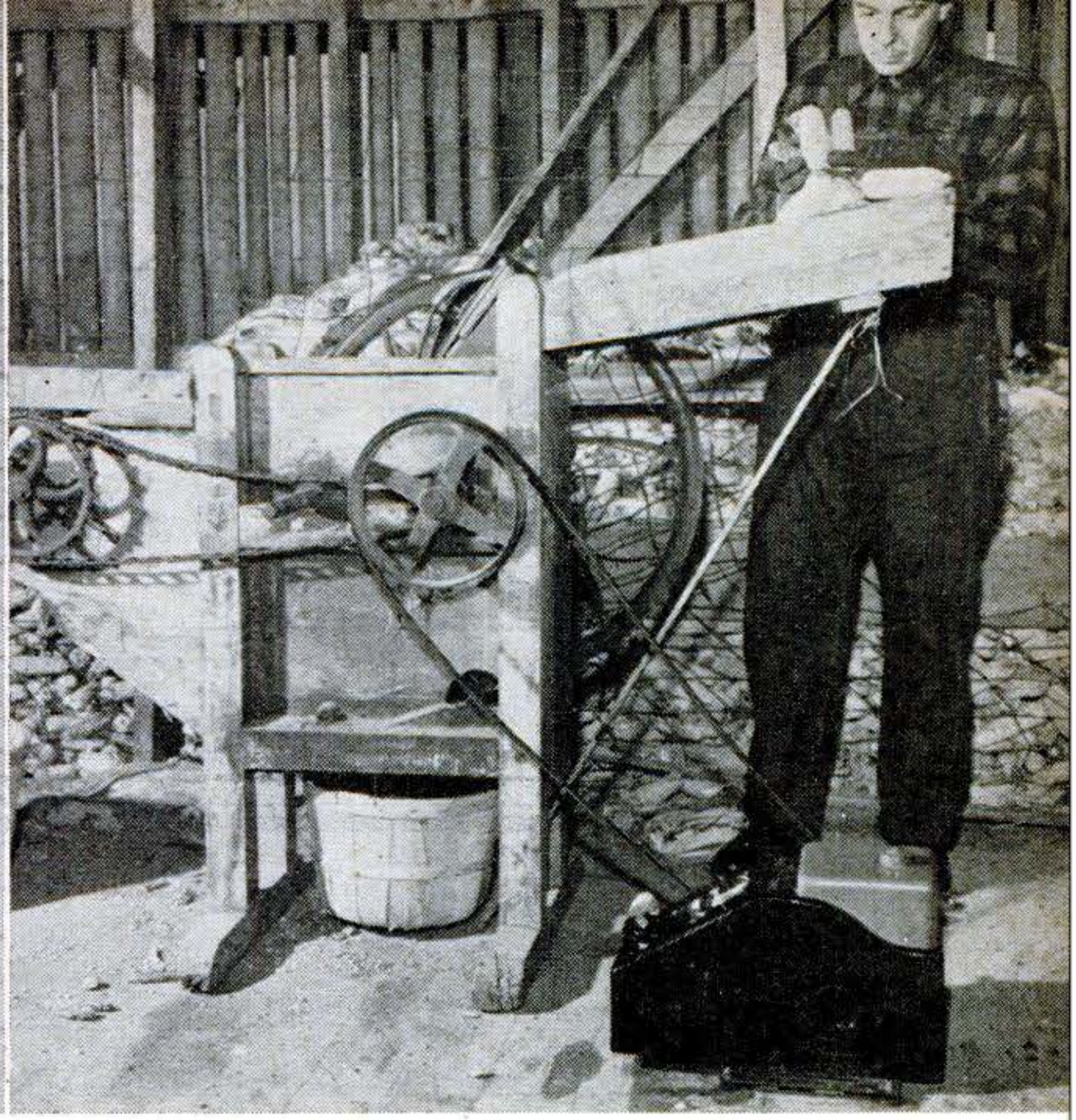
The contraption consists of a counterbalanced conveyer belt fitted with rows of curved steel prongs and mounted on the bow of a shallow-draft barge. An engine in the center of the craft drives the belt and provides power for the harvester to pull itself along the bottom by means of toothed tractor wheels at the lower end of the conveyer.

The main engine also supplies water for the counterbalance tank and operates a centrifugal pump that cleans incoming oysters with high-pressure water jets. A smaller engine at the rear of the barge drives a propeller when the harvester is idle.

The inventor of the machine, A. M. Brown, of Mobile, Ala., says it can replace 100 men using the time-honored but snail-pace method of picking oysters off the bottom with hand tongs. He rates it above automatic dredges, too, since the continuous motion of the rakes cultivates the bottom while scooping up oysters, leaving a bed ready for replanting. And an improvement is on the way that will even do replanting.

Copyrighted material

Light and compact, the Multi-Tool Ⓣ power unit shown above has a hand hole at either end for easy carrying and lifting. Its half-gallon gas tank meets safety regulations for indoor use.



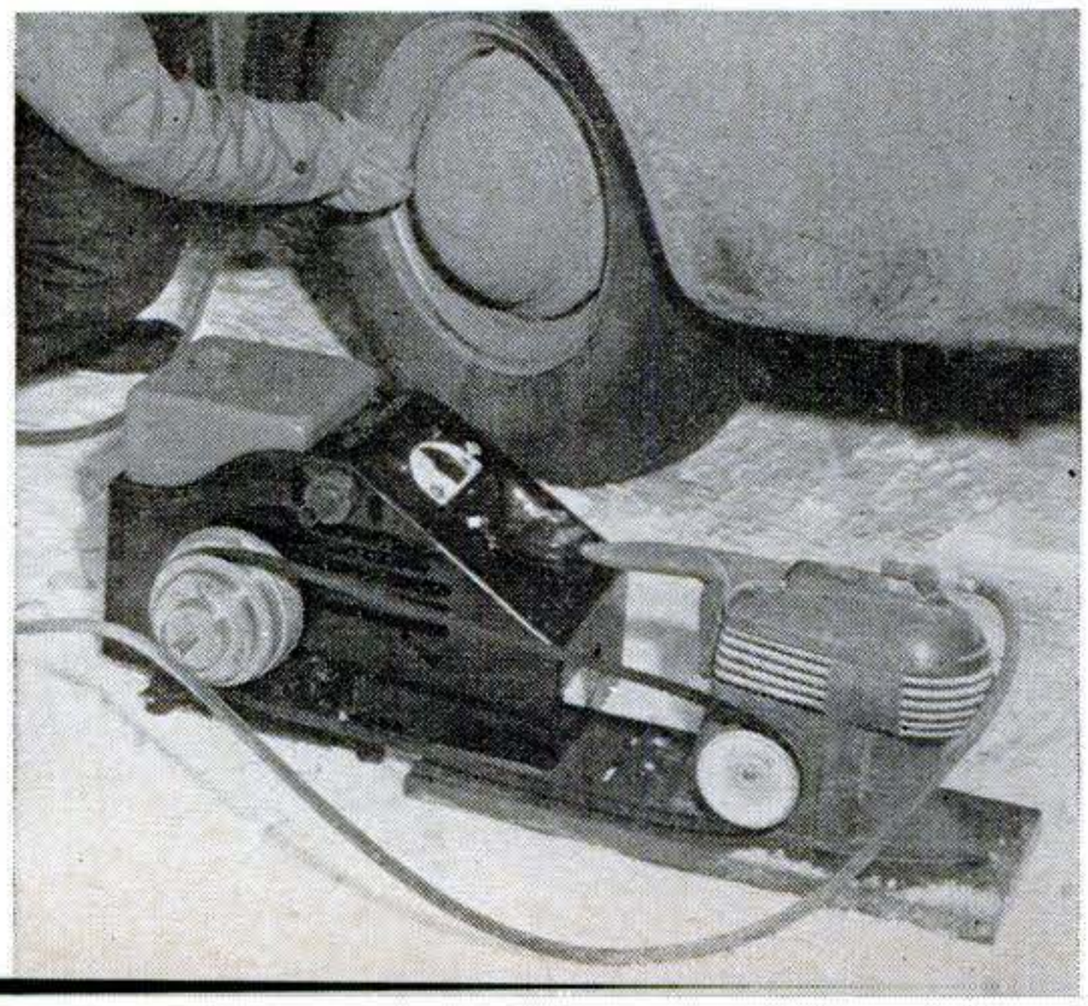
Here the unit is driving a corn sheller. Direct-drive speeds range from 1,600 to 2,600 r.p.m. Changing pulley ratio between power unit and driven unit gives a wider speed range.

Portable Power Parcel Is Jack-of-All-Trades

ON THE farm, on construction jobs, and in the home workshop, the new Multi-Tool Ⓣ power unit adapts itself to a wide variety of chores. The heart of the versatile machine is a Continental 1½-hp., four-cycle, air-cooled engine. It has a handy dial for fingertip speed control, and an automatic governor provides constant speed under load.

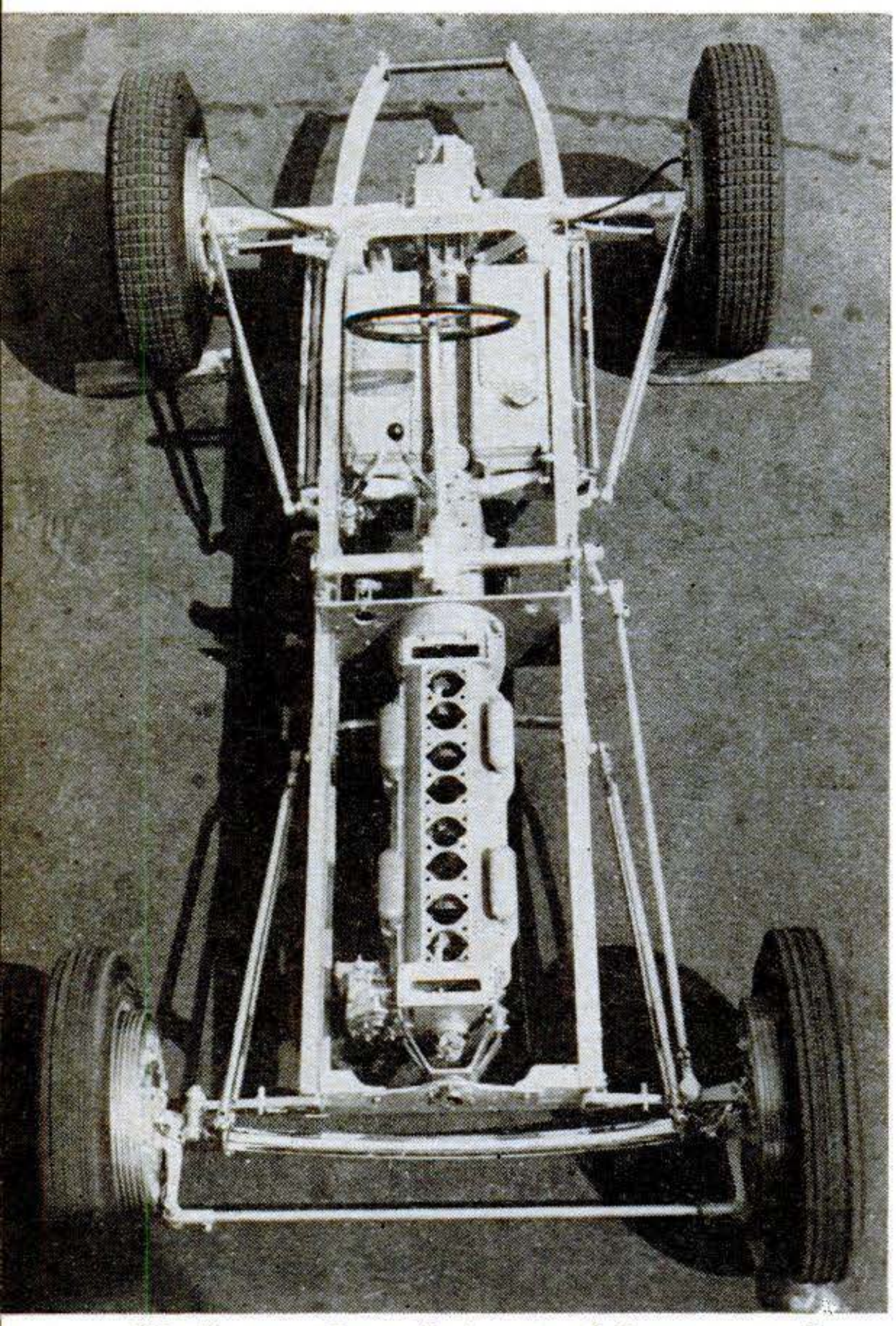
Accessories include a transmission enclosing an automatic clutch, a flexible shaft taking all standard tools, a sub-base for buffer and grinder, and an exhaust to pipe gases out of doors. The manufacturer, Continental Motors, stresses the unit's value as an auxiliary power source in areas where storms cause frequent current breakdowns.

Coming to the scene of trouble, the portable power machine runs the compressor that inflates the flat tire, as shown in picture below. It also will drive generators and bench tools.

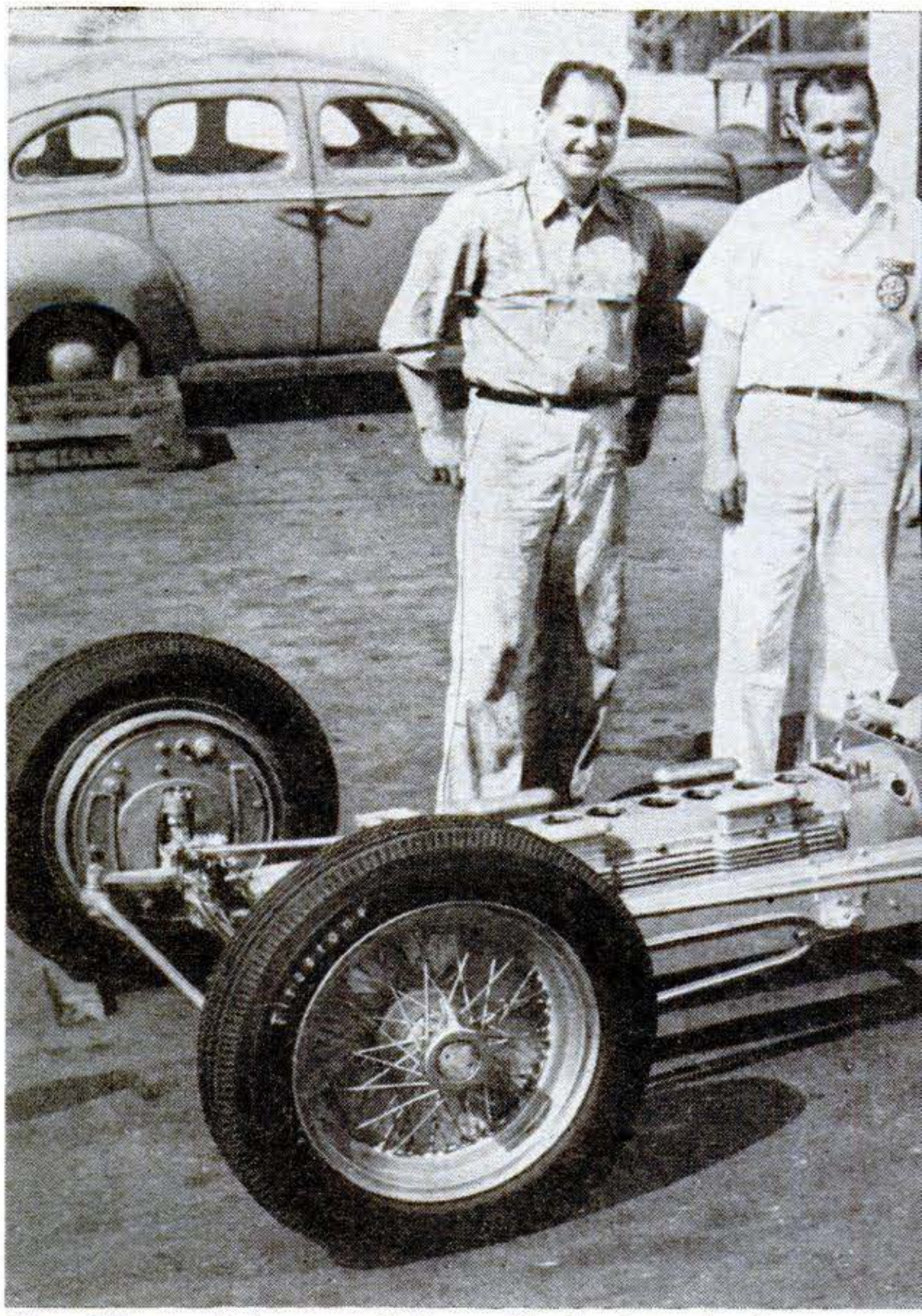


With flexible drive shaft attached, the Multi-Tool Ⓣ does a drilling job. It is equally adaptable for use as a buffer or grinder. The unit (on bench) is closed in a metal-sheet housing.

Full torsion-bar suspension keeps Bowes Seal-Fast entry close to the ground, saves weight.



Bird's-eye view of chassis of Bowes car shows how four-wheel torsion mounting replaces springs. Front and rear axles are conventional, as is the racer's channel-type, bolted frame.



Rex Mays, driver, and Pete Clark, his chief mechanic, beside the stripped Bowes racer. Engine, an in-line eight with only 183-cubic-inch cylinder displacement, turns out 350 to 450 hp.

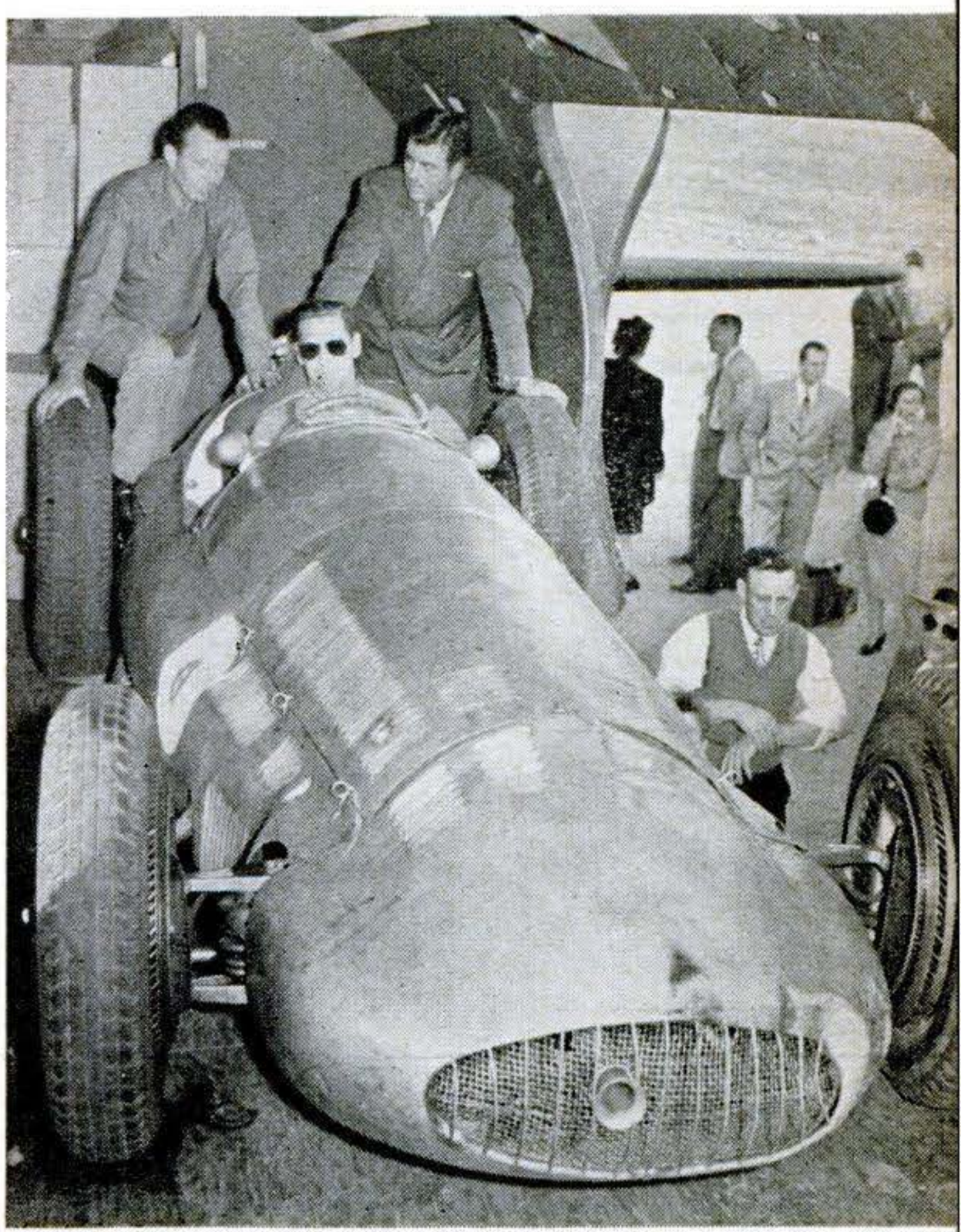
Copyrighted material

Speed Kings Get Set for The "500"

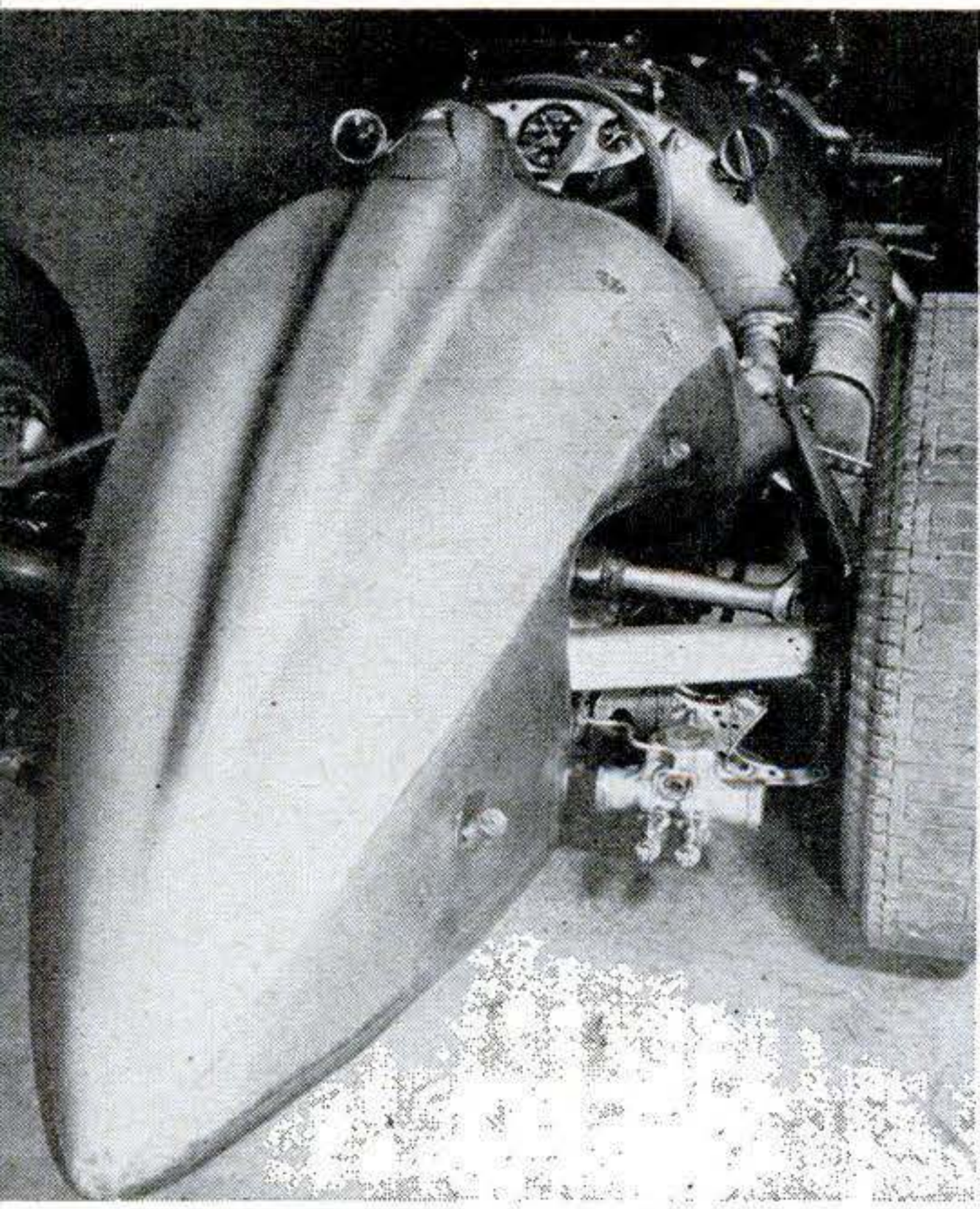
NOBODY knows for sure just what cars will blaze around the Indianapolis Speedway, come Memorial Day, in "the longest 500 miles in the world." But it's already clear that there will be some mechanical marvels in there fighting.

The race is limited to 33 cars, and there are about twice that many entries. Starting May 15, there will be five grueling days of trials. It takes smart design and mechanical know-how to make a car go fast enough, and far enough, to qualify for the Indianapolis 500.

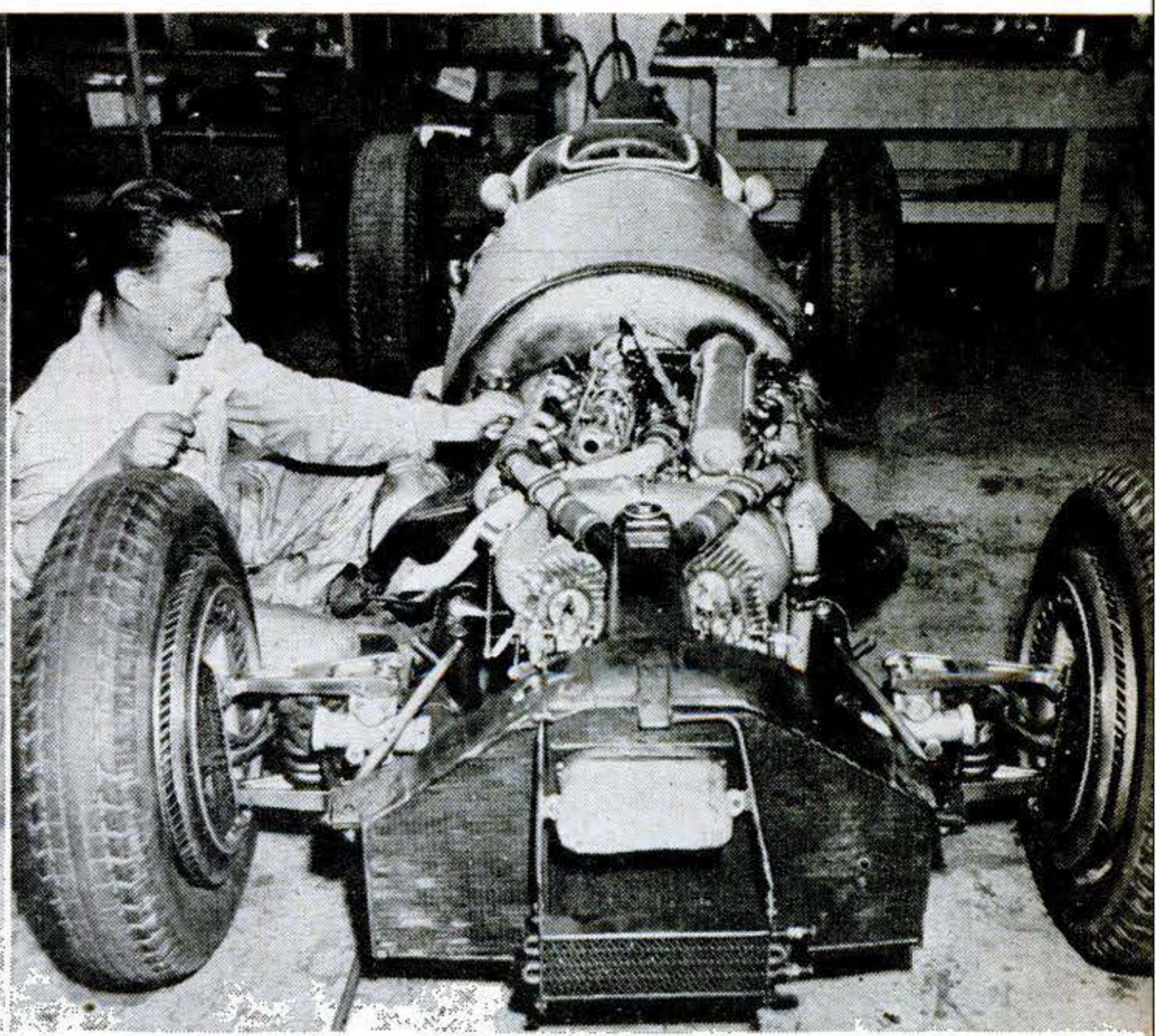
Pictured on these pages are two entries illustrating some of the tricks that will dress up this year's crop of racers. On paper, these two rate among the smartest, fastest designs in the field. But will they qualify in the trials, and if they do, will one of them be the winner? The answer lies at the finish line. You can find out on May 30.



Don Lee entry, a Mercedes Benz, as it arrived by air from Germany. It has done 248 m.p.h., has a manual control that allows driver to select soft or hard ride. Welded frame is tubular.



Mercedes has both cowling and tail gas tanks as part of body contour. Fine for weight distribution, this is a hazard in a crash. Transmission and differential are both at rear axle.



Twelve-cylinder engine is mounted on the bias, with torque tube on left of driver to permit lower seat. Brakes have turbine-type cooling system, fed by an air scoop on each wheel.

Copyrighted material

Who's the Winner?

FOOT races are often close, but with Bulova's Phototimer Ⓣ, there can be no argument. The camera's "eye" is an open, vertical slit trained on the finish line. The film, moving at about the same speed as the runners, records a progressive picture (above) showing each runner just as he crosses the finish line. Timer dials begin to operate at the start of the race. At the photo finish, the readings are photographed on the top margin of the film, automatically timing each man to 1/100 of a second.

Glassless Lens Beams Radio Waves

WHEN you make a long-distance call from New York to Chicago in the future, you may talk through a man-made copy of a glass lens. For the antennas on A. T. & T's new microwave relay network between those cities will be plastic or metal models of the molecular structure of a glass lens.

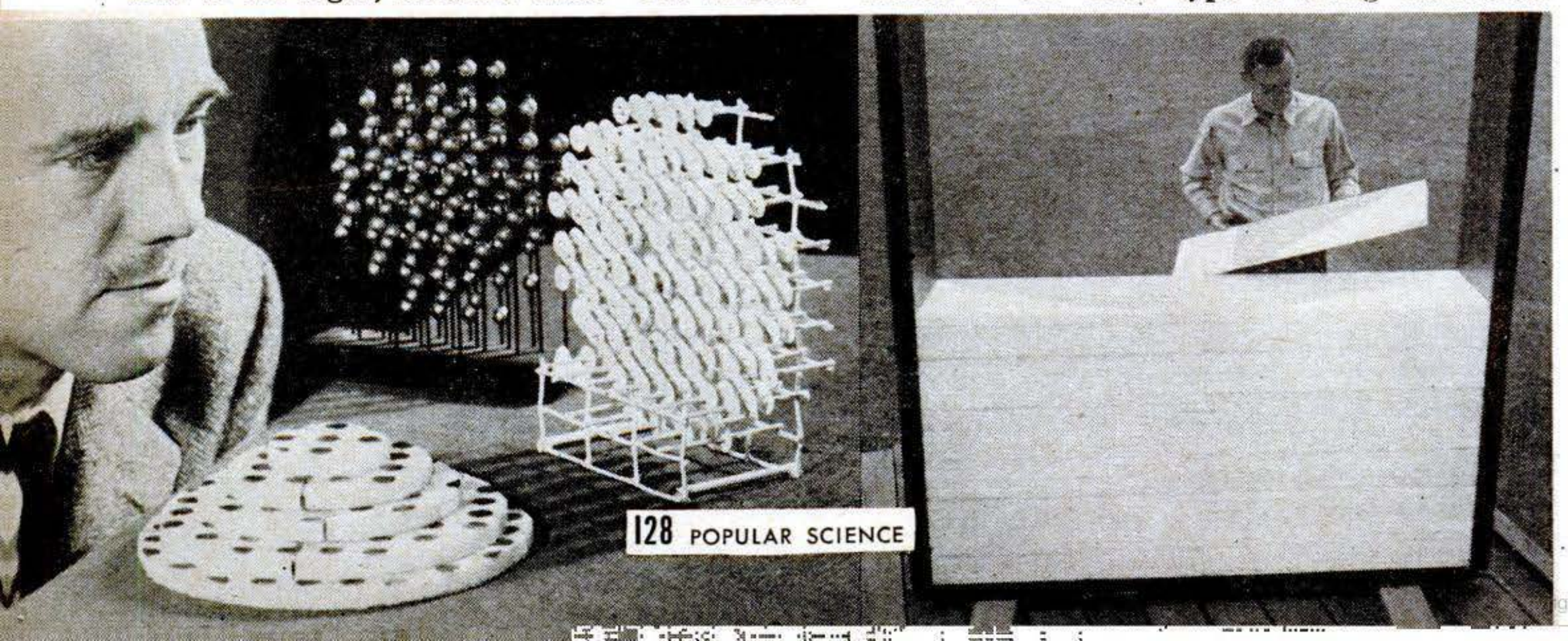
These new radio lenses can carry a much heavier load than older devices—10 television programs or tens of thousands of phone calls at one time. The old-style, funnel-like metal lenses used on the New York-Boston link are limited to a few hundred phone calls at once.

Radio waves of very high frequency act much like light waves, and it is theoretically possible to focus them with glass lenses. But such a lens might measure 10 feet across and weigh several tons. Therefore, Dr. Winston E. Kock, Bell Laboratories' scientist, built a *model* of a glass lens, arranging plastic balls or bits of metal in the pattern that physicists believe real molecules take in a piece of glass.

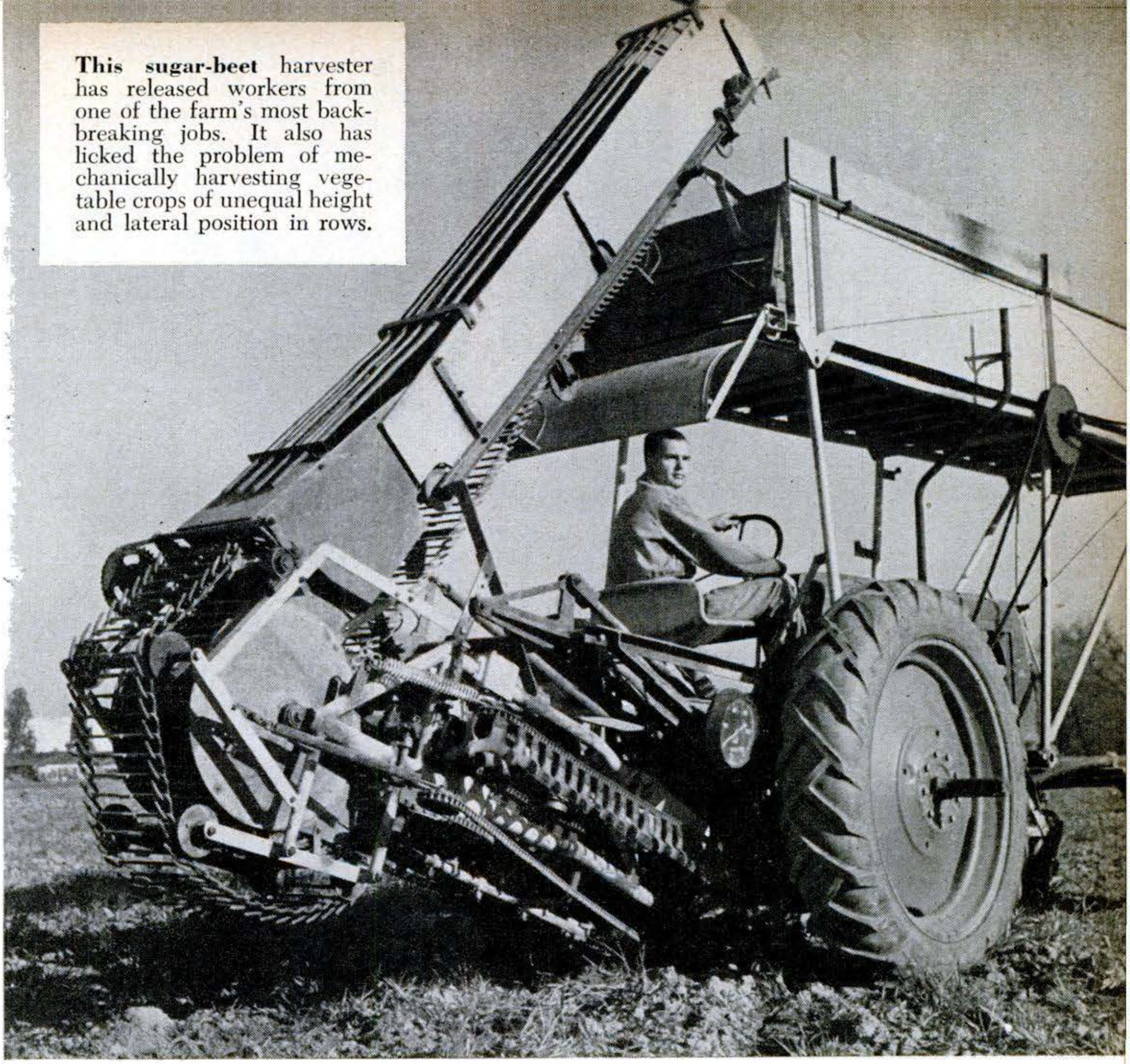
The trick worked. By correct shaping, Dr. Kock designed a lens that focuses microwaves into a sharp, narrow beam. This concentrated microwave beam sends nearly all the transmitter's power directly to the receiving station, wasting very little. Thus lower-powered equipment can be used.

The new lenses are less sensitive to small changes in the wave length of the beam. This means they can handle a broader band of wave lengths without losing sharpness. And the broader the wave-length band, the more traffic that can be crowded into the band for transmission at one time.

Dr. Kock inspects small-scale models of his lens. One in rear uses metallic spheres, and that to the right, metallic disks. One in foreground has thin metallic disks mounted in polystyrene foam. At right, below, a full-scale model of the latter type is being assembled.



ghted material



This sugar-beet harvester has released workers from one of the farm's most back-breaking jobs. It also has licked the problem of mechanically harvesting vegetable crops of unequal height and lateral position in rows.

Fantastic Farm Machines Turn Fields into Factories

Woodshed inventors and crossroads shops have given the farmer a whole new set of ingenious machine tools.

By Ladd Haystead

IF a farmer had gone to sleep 20 years ago and just awakened now, he would be so bewildered at what has happened to farming that he literally would be unable to make a crop. If he had gone to sleep only 10 years ago, he would need at least a refresher course before he could operate.

In 1927 there were more than 15 million horses on farms; today there are only about half that number. Before the war there were a million more workers in the fields than there are today, and 1950 will probably see even fewer men on the farms.

This historic shift has been brought about by farming at long last catching up with industry in the use of machines. But unlike

Copyrighted material

The lightweight Allis-Chalmers Roto-Baler® shown above is operated by one man. It makes round bales tied with twine instead of the more costly wire used by older types. The rolled bales can withstand rougher handling and are more weather-resistant than rectangular ones.

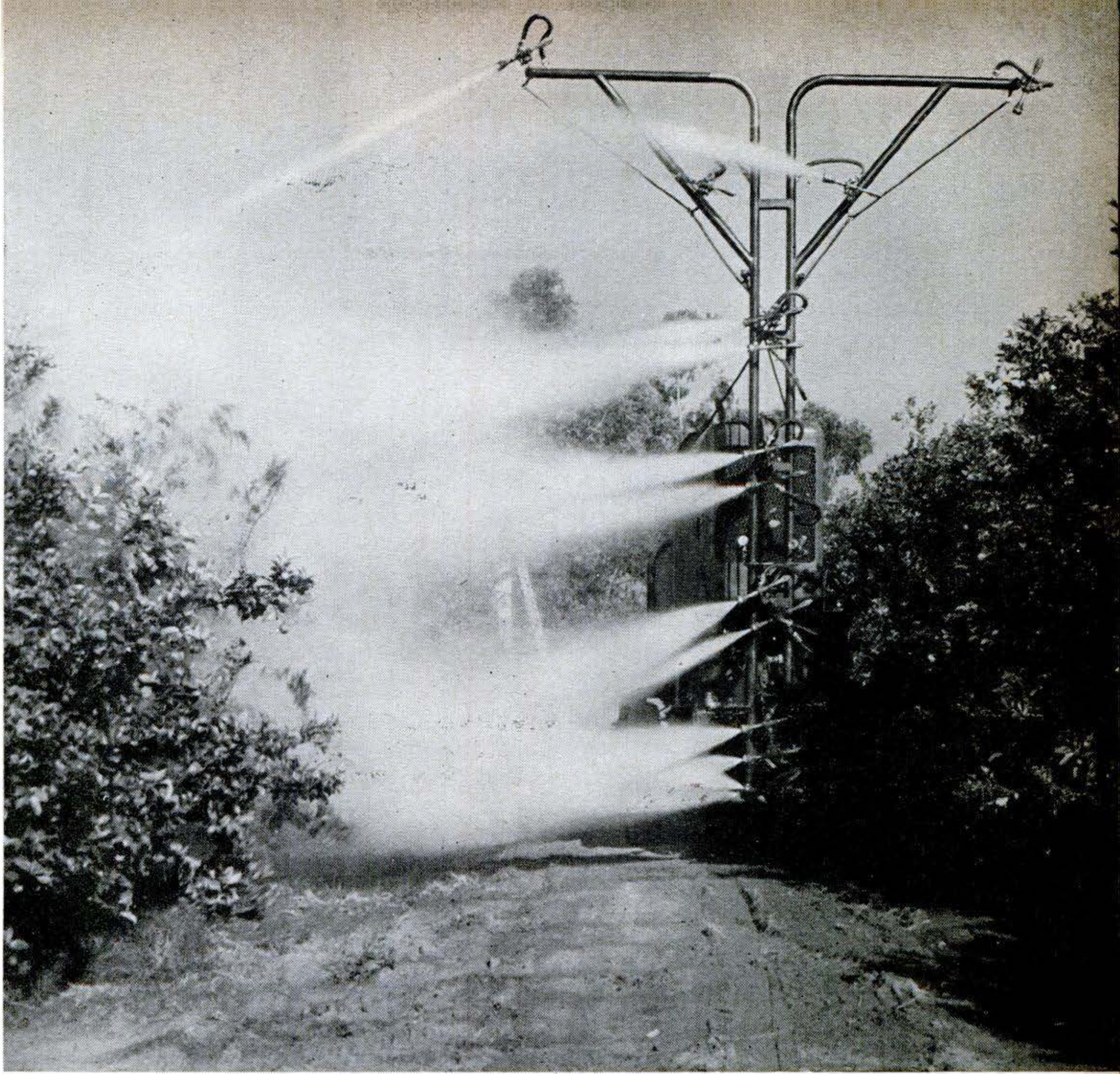
industry, the new farm machines did not as a rule come from laboratory or research departments. The farmers themselves are the fathers of modern farm mechanization. More often than not, the contraptions they invented were machines that by engineering rule "just couldn't work." But, unfettered by rules, these Jules Vernes of the soil went right ahead and made them work.

Farm machines used to be as standardized as a hoe, designed for use in any part of the country. Now many are built for just one crop in one locality. The old-time "full-line" companies aren't that any more. To be actually full-line would mean stocking thousands of items in addition to the already huge inventories the big companies must carry. So small companies build and service locally designed machines right in their own back yard.

Typical of the way crossroad inventors harness imagination is the application of the vacuum cleaner to the fields. In California, a huge, portable "sucker-upper" was built to glean ladino clover seed. Besides doing the work of large numbers of laborers, the machine paid for itself in the extra seed it saved over any other harvesting method. Vacuum sweepers also have been designed to pick up apricots, almonds, and filberts after they have been shaken off the trees. And there is a mechanical tree shaker: simply a pole or cable that jerks back and forth when hitched to a tractor pulley.

During the war the hop crop was in danger of being lost because of labor short-

Copyrighted material



The war against insects grows apace, with Man just about holding his own despite more powerful chemicals and better distributing methods. The dual-boom sprayer, shown above, shoots out chemicals in two directions at once from 16 short guns. It reaches a height of 15 feet.

ages. It was saved by an improvised portable hop picker. Then came a mobile vine-seed harvester to collect pumpkins, melons, and gourds whose seeds are a specialty crop. Bren-gun carriers on surplus sale were snapped up by rice farmers who always had trouble entering the wet fields to unload the rice combines.

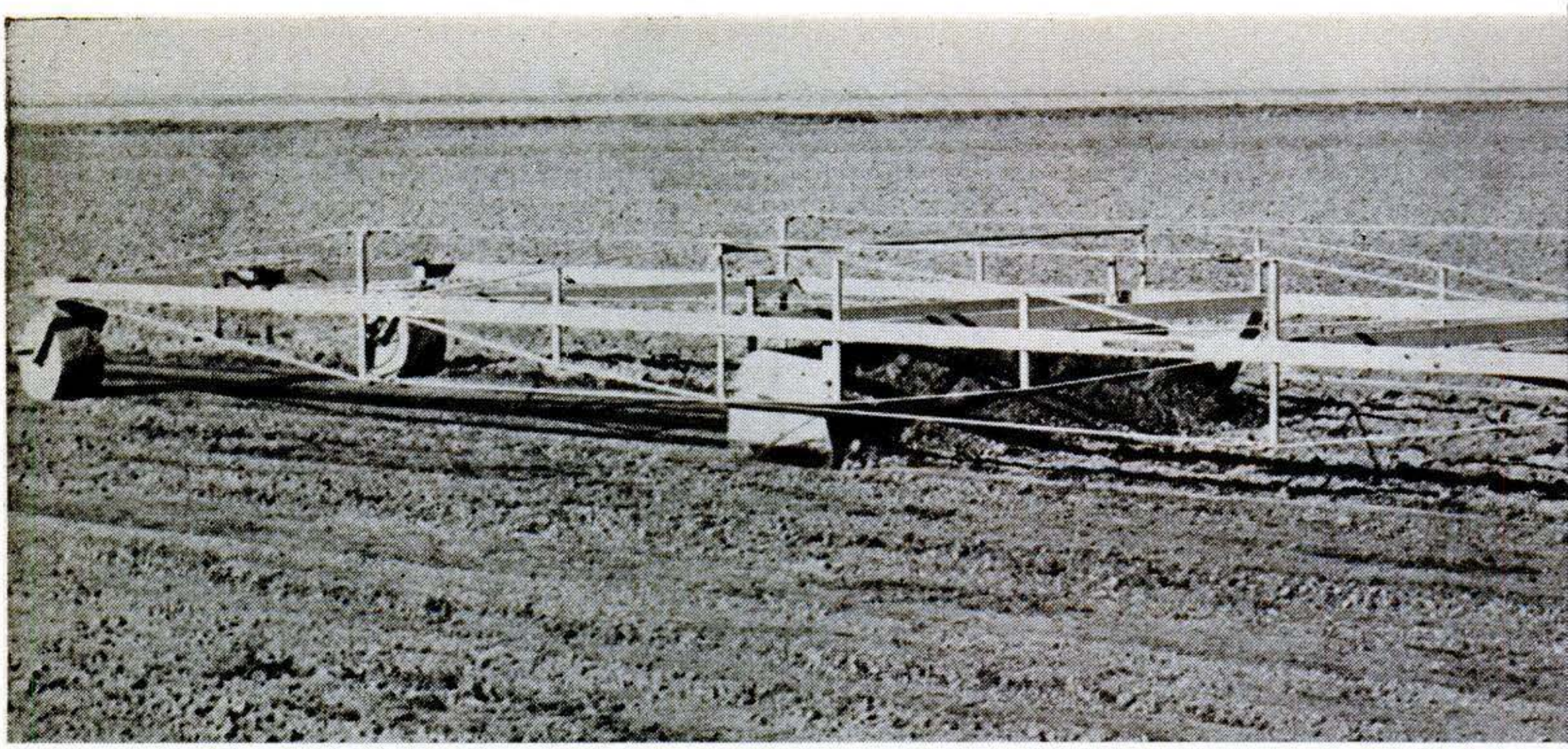
Peas and Beets Get Machine Treatment

As this is written, the first pea combine is being announced by the Universal Harvester Co., of Stockton, Calif. No more popping of pea pods by hand, or even collection by tractor-mower for hauling to a field machine-sheller. One machine picks and pops right in the field.

But the Pacific Coast is not the only area that has felt the impact of mechanization. Sugar-beet fields from Sacramento to Michigan are almost empty of the crews of tens of thousands of "stoop" laborers that used to do the man-killing work of beet culture. Now the seed that comes naturally in rosettes is segmented by a sort of motor sander. The seed is then planted by new precision seeders. By this method, beets no longer grow in clusters that have to be thinned out by hand. Weeding can be done by machine-powered checkrowing or cross cultivation. Then the most Rube Goldbergish of all the new machines, the sugar-beet harvester, comes along, doing the work of anywhere from 10 to 75 men (PS, Feb. '48, p. 158).

This machine, in its newest form, cuts the beet tops off and delivers them at the side

Copyrighted material



Level land prevents water puddling, speeds farm operations, cuts costs. The Landplane®

for making cattle feed. The beet itself is gently freed from its tight soil packing so the tap roots will not be broken (as in early models). Then it is lifted, shaken clean, and elevated to a hopper riding above the tractor and mounted digger. The hopper has a moving bottom sheet that gently pushes the beets ahead so that the box may be filled without bruising the easily damaged tubers. A big hamper enables the machine to work to the end of a row where a collection truck waits.

Soon an onion digger, now under field testing, will take the pain out of harvesting that crop. This machine is mounted on a tractor. It is light and fully automatic. It snatches the onion from the ground by its green topknot, shakes it, snips off the greenery, and delivers the bulb either to the side or directly behind to a pulled trailer. One man can do the job of 25 hand pickers.

Attachments Are All-Important

In New England, some tired-of-it-all farmers have developed a stone picker to remove the endless crop of rocks from the fields. In Wisconsin, an amateur has put hydraulics to work in a hay baler, getting away from the heavy flywheel that pushes the plunger in most models. In Louisiana, a mechanical sugar-cane harvester is at work.

Not so long ago, most farmers couldn't afford tractors; there wasn't enough steady work to justify the cost for the very few jobs they could do. But during the war, farmers and woodshed inventors everywhere started to build their own tractor attachments. These gave the power units uses not even dreamed of a few years before.

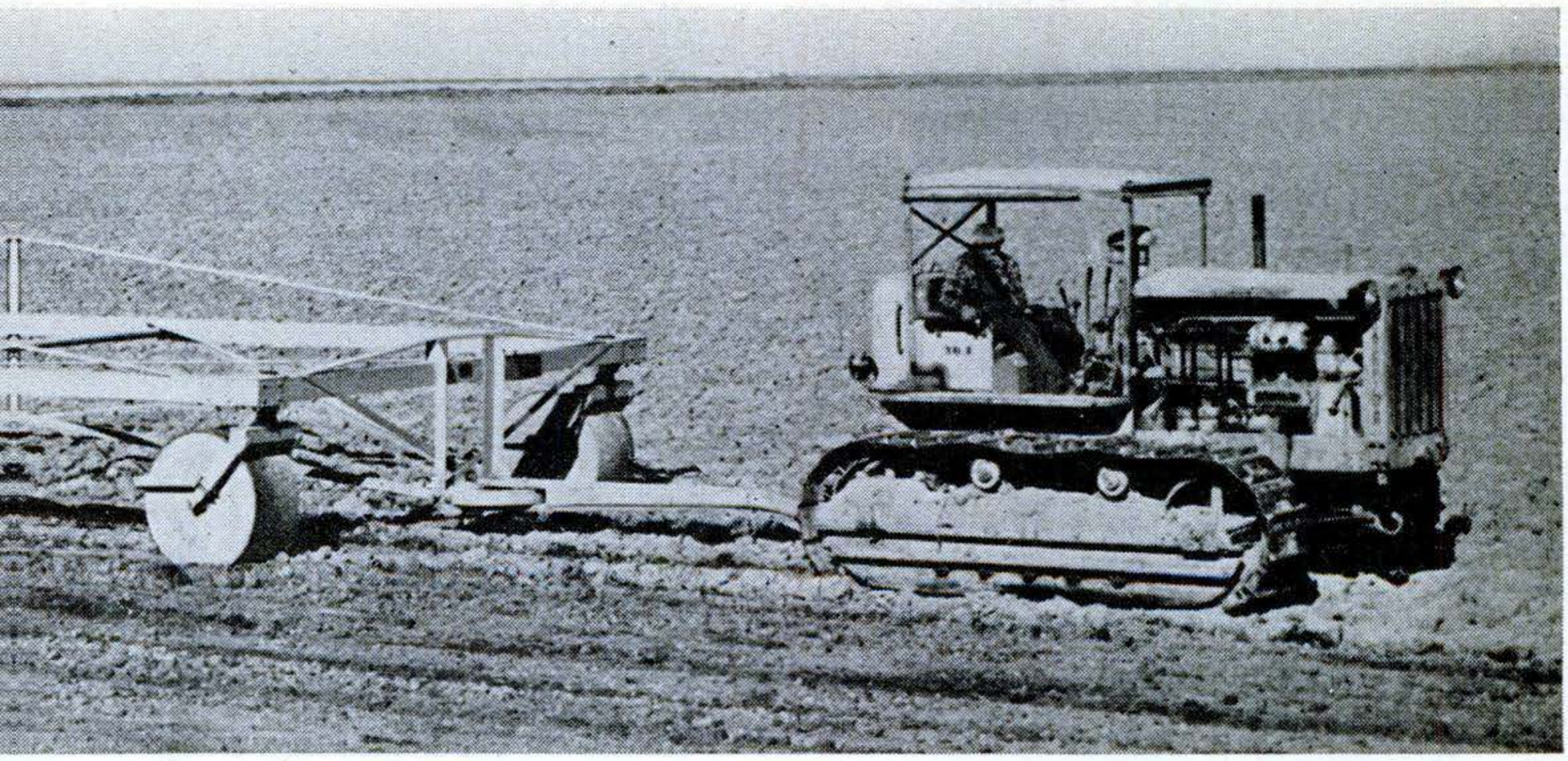
A combination front-end attachment, for instance, can be an excavator, manure loader, terracer, snowplow, ditcher, and elevator all in one. Posthole diggers for tractor attachment are now a feature of every farm show. A mounted, power-take-off concrete mixer for the Ford tractor is on the market. Wood saws are appearing that work either from the tractor pulley or the power take-off.

One ingenious man concluded that painting farm buildings the old way was the hard way, too costly, and too dangerous if one had to lug ladders all day and possibly fall off one. So he built a scaffold on his tractor elevator and attached a paint spray to the engine. Now he can be lifted up and down, driven laterally or from job to job by his son. The power spray makes it possible to paint in hours what took days with hand brush.

The three-legged stool, badge of the dairyman, is disappearing just as fast as farmers can get materials to build milking platforms. Now the cow climbs a ramp, stands in a stall at hand level instead of the man stooping down. The milker standing at workbench level can keep anywhere from three to six cows going at once.

Silos are fed out by electrical unloaders, while barn gutters are cleaned by mechanical gutter washers. Hay is elevated into the mow by mechanical bale elevators in some places; it is blown in as chopped hay in others. It can be brought in from the

Copyrighted material

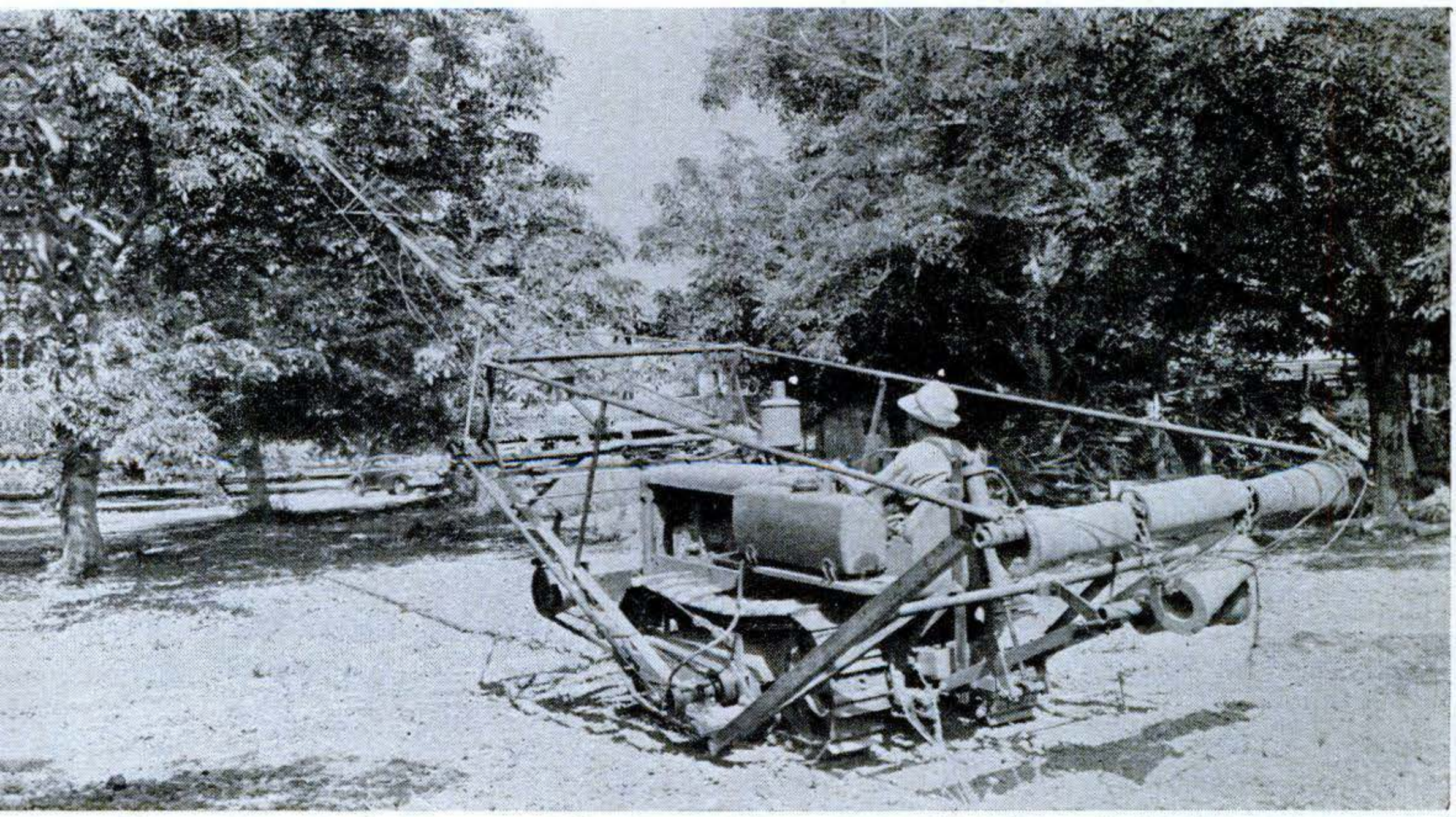


(above) shaves 6⅜ acres an hour at a cost of about 60¢ an acre. It is 80 ft. long, 15 ft. wide.

fields, either as long or chopped hay, in a high state of moisture for mow-curing in new installations using heated air blown up through floor ducts. Some users say they can just about make hay while the rain falls.

In Connecticut, a scientist is working with a variation of radar to select seeds that will grow best. If his work is successful, the farmer will plant only seeds that will assure him the most vigorous and highest-yielding growth. Another inventor is on the verge of success with an electronic tomato harvester that will select the fruit by color and size.

Perhaps the most exciting news of all is that we now stand on the threshold of industrial farming with chemicals. Large acreages of corn in the Mississippi Valley, apparently doomed last year, were saved by 2,4-D.



The mechanical tree shaker is a farm-invented device. Formerly nuts and some fruits were harvested by men using long, hooked poles, a tiring and costly method. The tractor-powered machine pictured here can shake out 50-foot walnut trees at the rate of 10 acres a day.

Copyrighted material

This chemical is now in such demand by scientific-minded farmers that this year's total production of millions of pounds will not satisfy even a fraction of the requirements. And right on 2, 4-D's heels comes the announcement of other selective killers, such as BHC and IPC, to lighten the farmer's work.

These and numerous other chemicals suggest that mechanical cultivation may become as outmoded as the wooden plough. Weeds and pests probably will be controlled completely by spraying and dusting. Some farmers are talking of combining the pesticides with fertilizer so that one trip over the fields can do two jobs (PS, April '48, p. 108).

Airplane Does Farm Jobs

This is one of the things that has brought airplanes into the farm picture. Planes spray fields for weeds, bugs, fungi, and fertilization. In the Southwest, airplanes are seeding vast areas of over-grazed range as well as tree lands for reforestation. Killing leaves on cotton plants to pave the way for the big mechanical harvesters is almost entirely a plane job. In California, planes are used for herding wild fowl away from rice fields.

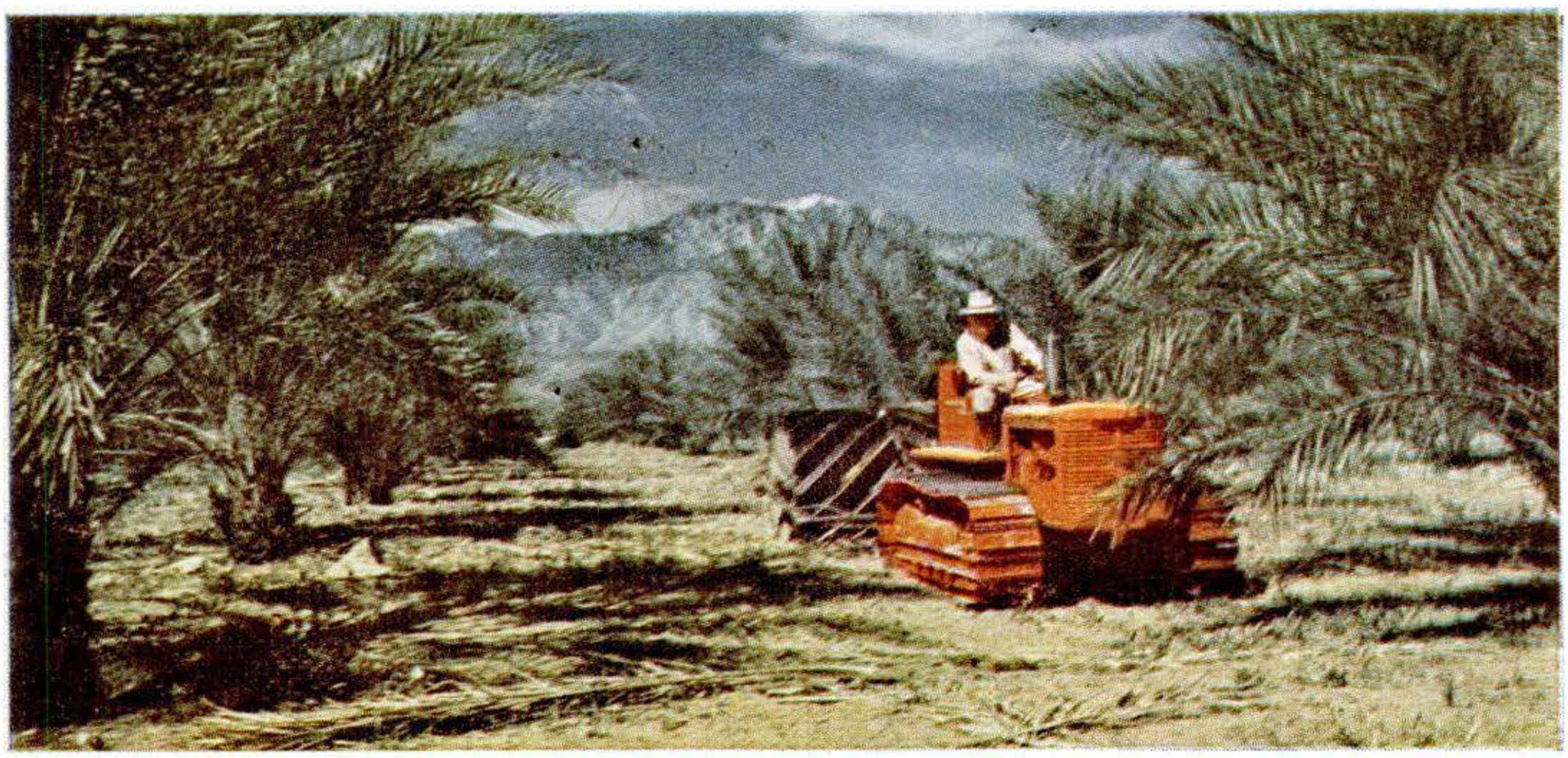
Perhaps the most Sunday Supplementish of all ideas came out at a recent Northeastern Forage Conference. In Cambridge, Mass., a maker of ultrasonic equipment announced strange and wonderful things were being done with sounds above the hearing capacity of human ears, sounds like those made by silent dog whistles. With them such fantastic things as stopping the action of yeasts and killing bacteria can be done.

There was an immediate request for experiments using sounds to halt all chemical action in a silo. With such a device, forage crops could be brought from the field when their carotene content was highest. Regardless of weather, they could be dumped into the silo and literally "sound frozen." No bug, germ, bacteria, or enzyme could get in its dirty work until the silage was opened.

Thus it seems possible, at least on paper, for milk cows to give as rich, cream-colored milk in January as in June, licking another farm problem. And if ultrasonics can do this for hay, there is little reason why many other feed and food crops can't be protected in storage for long periods of time. This would mean a saving of possibly billions of dollars a year now lost on crops in storage that are destroyed by bugs, weevils, and fungi. The perfection of this technique is close enough at hand so that provisions for its use are already being made in flour mills and grain elevators.

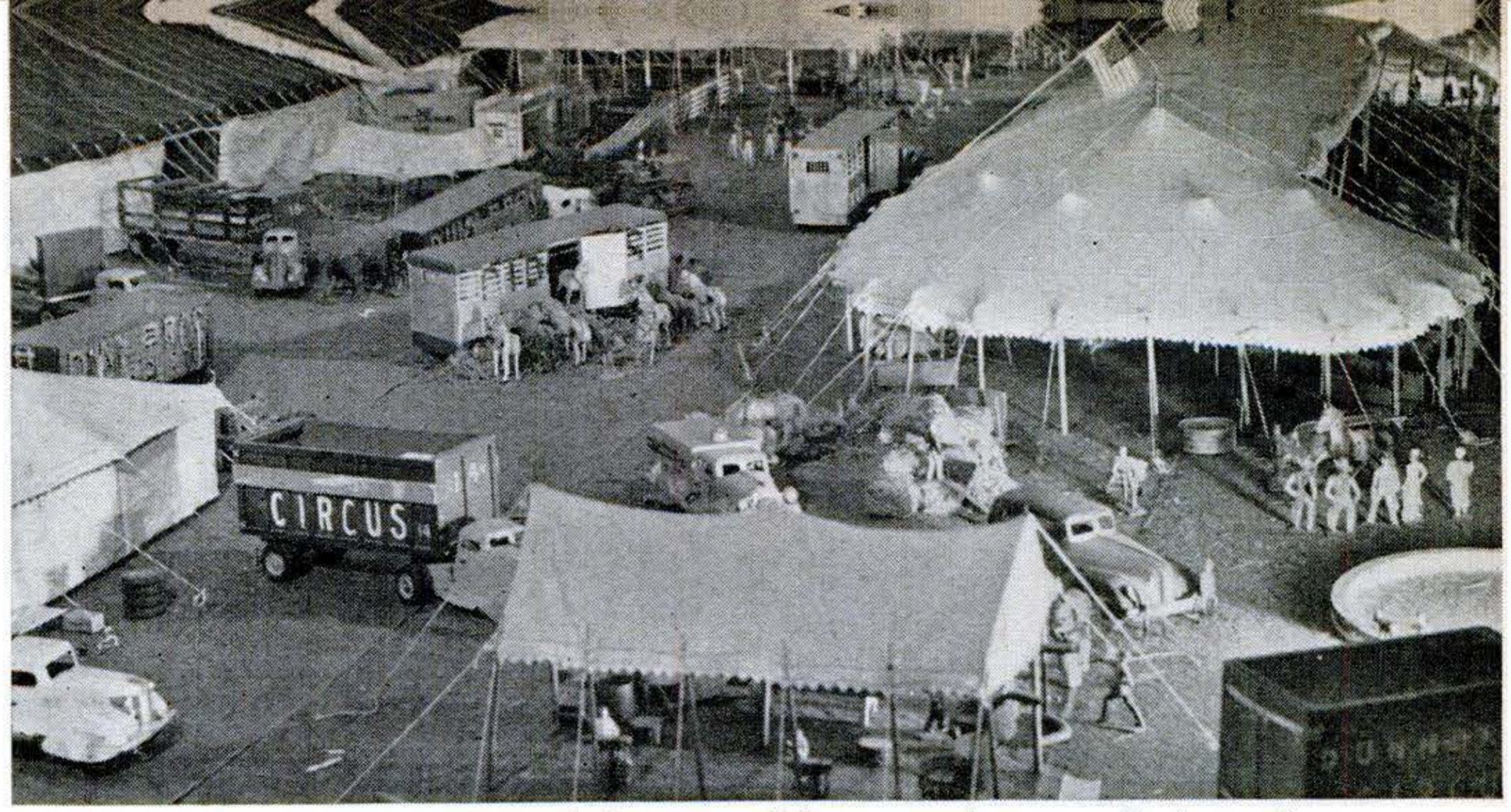
Today helicopters and infrared rays are used to protect orchards from frost; dry ice from airplanes is making rain; germicidal lamps are protecting poultry from disease; and radios that bring in the World Series are in the barn and on the tractor.

About all that is needed to eliminate labor completely is an Automatic Income Tax Calculator that can understand the forms the farmer has to make out, in many cases for the first time. END



For generations American farmers destroyed crop wastes, with the result that the humus content of our soils disappeared. Modern farmers chop and turn under all organic matter as this roller-chopper is doing to the leaves and stalks of a date grove in Southern California.

Copyrighted material



"Behind the scenes," busy attendants transfer horses from wagon to tent at right. Tent in left background is "air-conditioned" Big Top.

Model Circus Rivals Real Thing

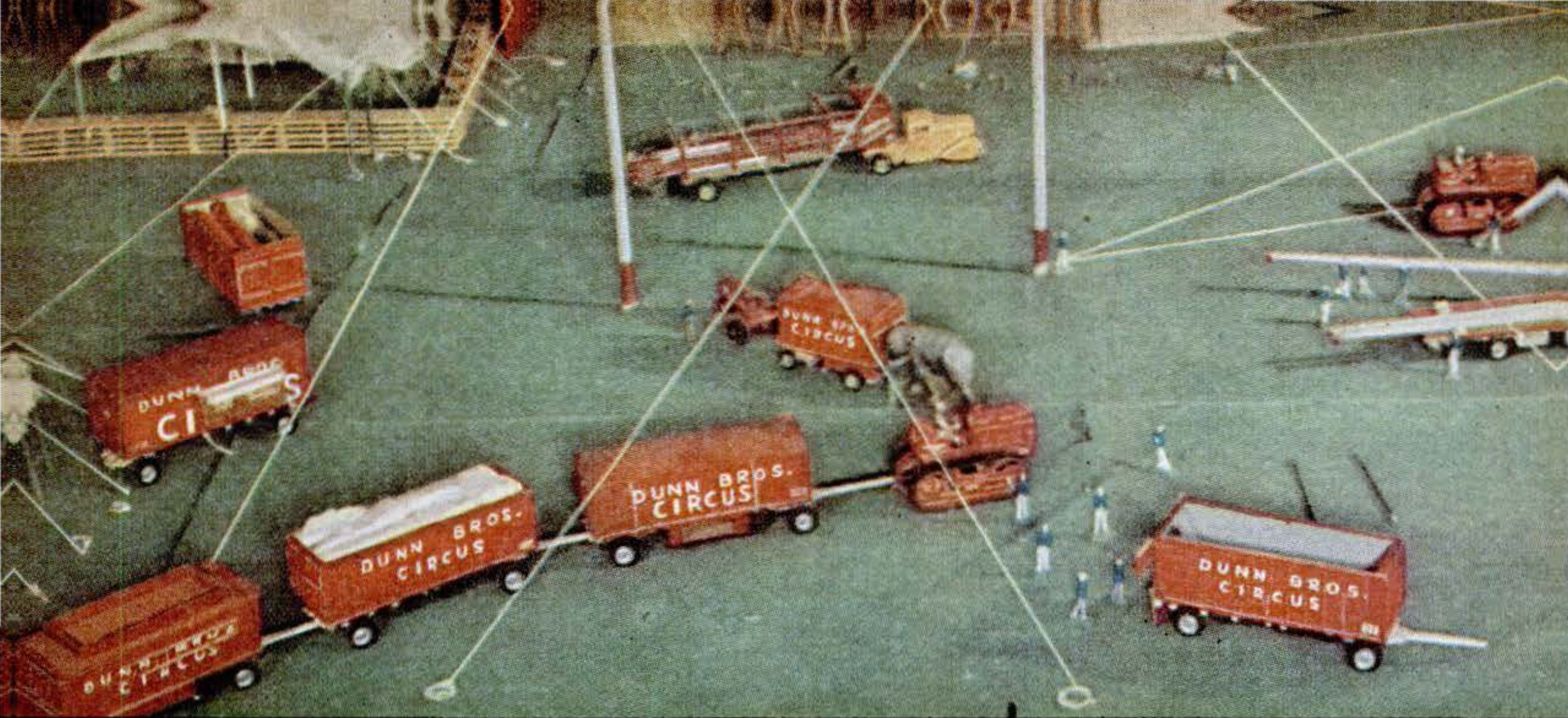
PS photos by Hubert Luckett

At light-control panel, J. Harold Dunn accompanies a performance with spoken commentary over microphone and public-address system.

"THE biggest little show on earth" is a 34-by-83-foot circus in miniature. J. Harold Dunn, of Kansas City, Mo., spent 18 years building it. The exhibit now tours the country, drawing crowds of children and grownups to see famous professional "acts" faithfully simulated on a scale of one-half inch to the foot. The Dunn Bros. Circus (the "brother" is imaginary, a familiar fiction in show business) boasts 54 tents, 4,500 miniature people, and 3,500 animals.

Dunn himself whittled patterns for the plastic human figures, hand-carved some of the animals from wood, and modeled others of papier-mâché. Most scenes are stationary tableaux, but a 150-foot-long parade is animated by hidden mechanism. An electric control panel varies lighting from a "day" scene with flood lamps to a picturesque "night" effect with 500 midget bulbs, as shown on the following pages.

Copyrighted material



COMING TO TOWN in miniature wagons, circus is "set up" on its lot with aid of tractors and elephants.

BALLYHOO MEN, flanked by freaks and hula dancers, beckon circus-goers strolling down Midway to the supercolossal attractions of the sideshow in illuminated tent at rear. Hot-dog stands and balloon

GALAXY OF ACTS in three-ring, four-stage Big Top includes lion tamer, acrobats, and trained animals.

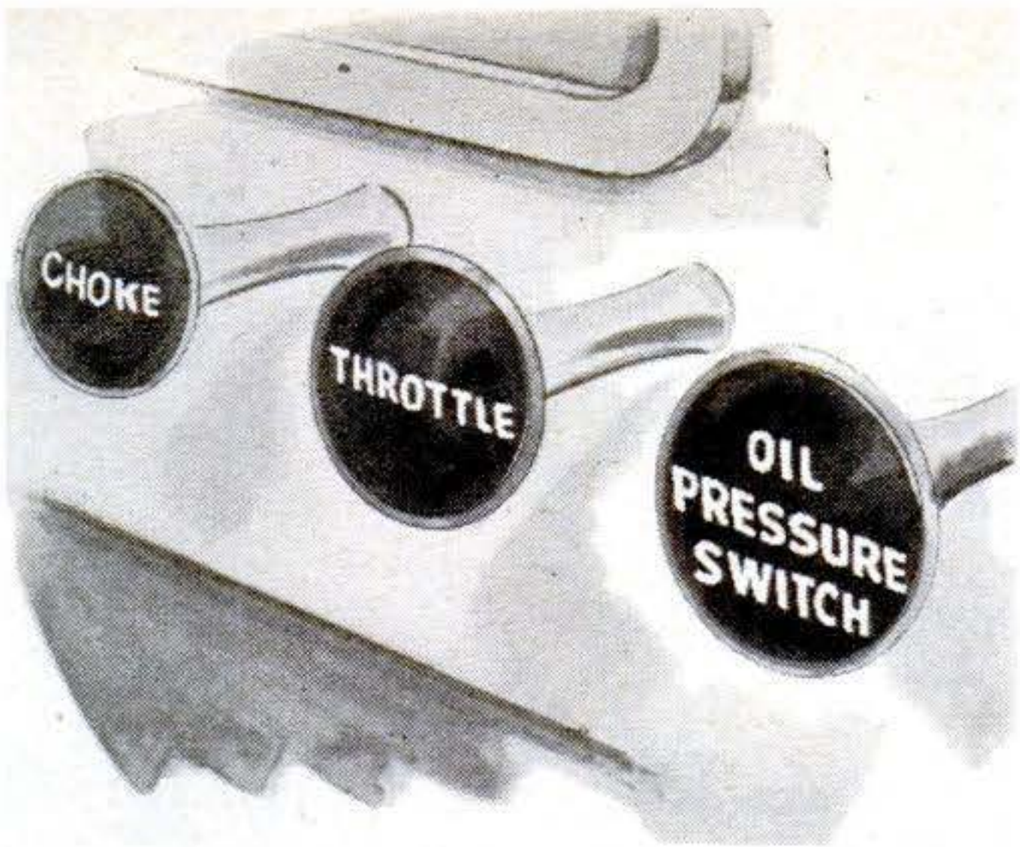
vendors offer their wares to passers-by. Midget bulbs provide the lighting for this picturesque "night" scene.

DAREDEVIL AERIALISTS' act vies for attention with tumblers' antics on the Big Top stage shown below.

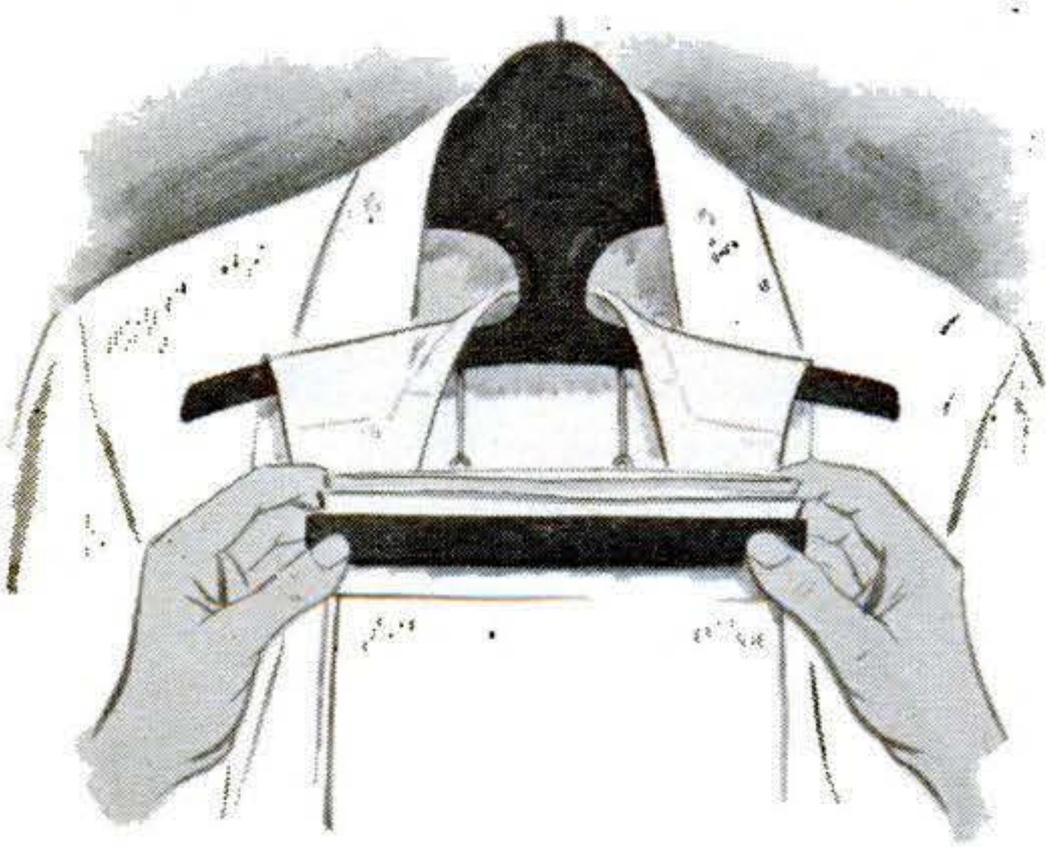
Copyrighted material

I'd like to see them make...

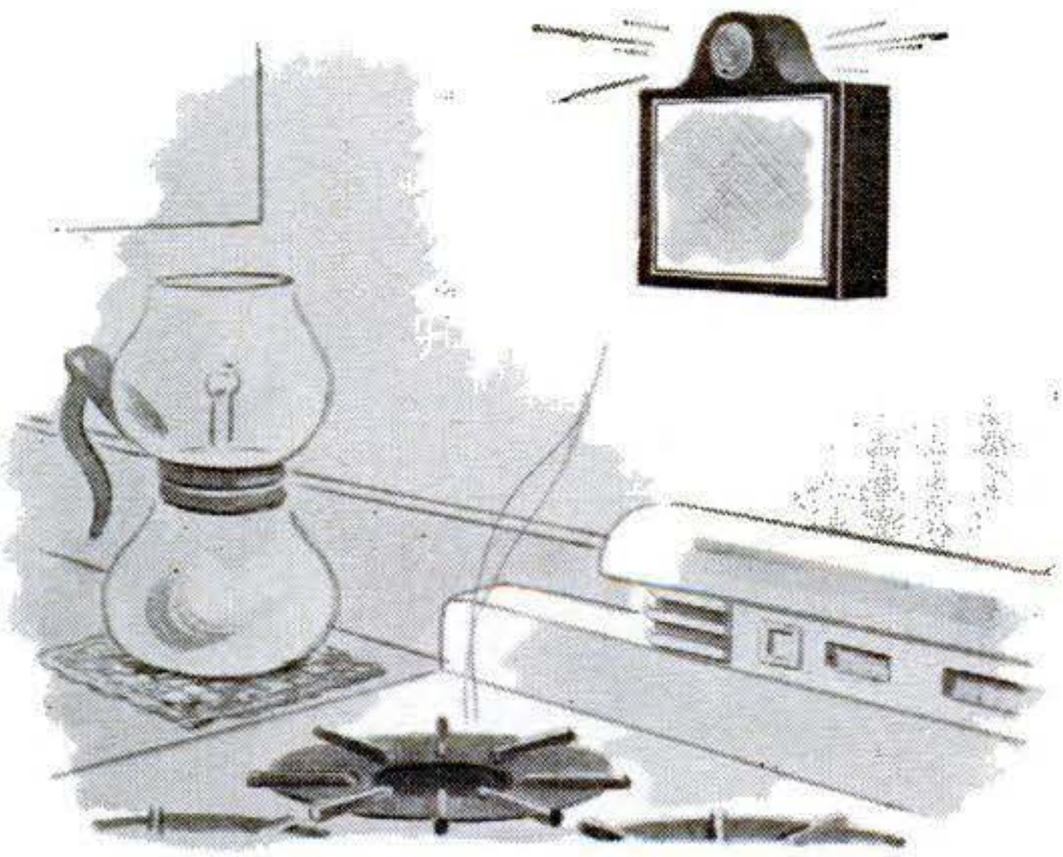
Everybody has his own pet idea of some gadget he would like to see in general use. What is YOURS? *Popular Science* will pay $5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.



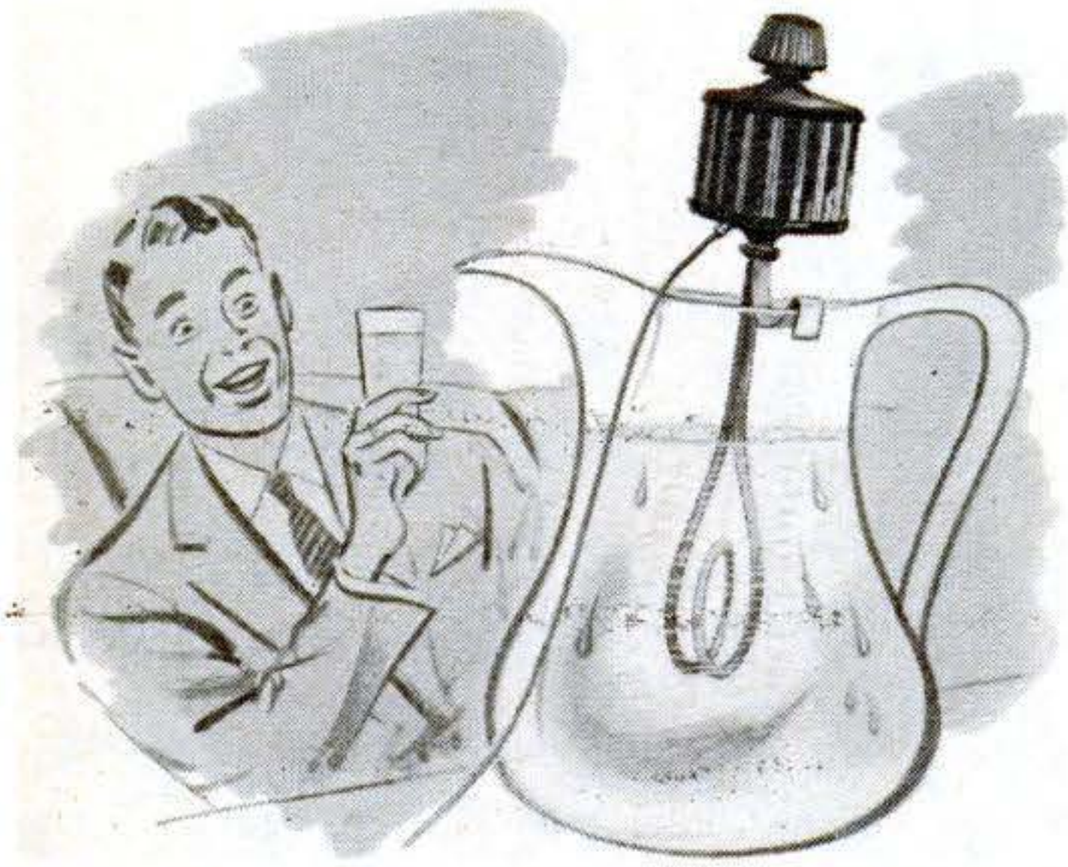
A Protective Switch for Cars. An automatic switch that would blow the horn when oil pressure fails would avoid engine damage. For starting, a dash button could bypass it until pressure built up.—*D. L. West, Vallejo, Calif.*



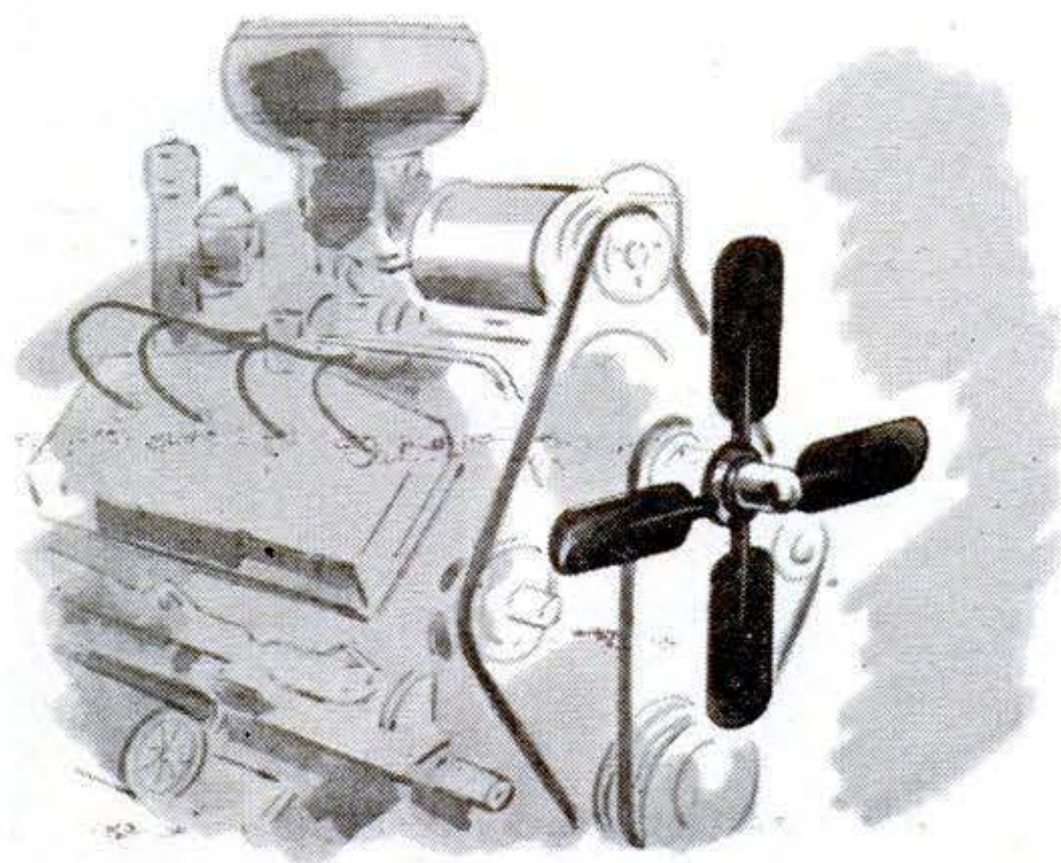
Hangers to Take a Coat First. It'd be great to have a clothes hanger on which you could place your garments in the order you usually remove them—coat first, vest next, and your trousers last.—*Fred Way, Burlington, N. C.*



An Escaping-Gas Alarm. Why doesn't someone make a bell alarm that rings if escaping illuminating gas builds up to a dangerous concentration? The alarm would be especially good at night.—*M. W. Scott, Wilkes-Barre, Pa.*

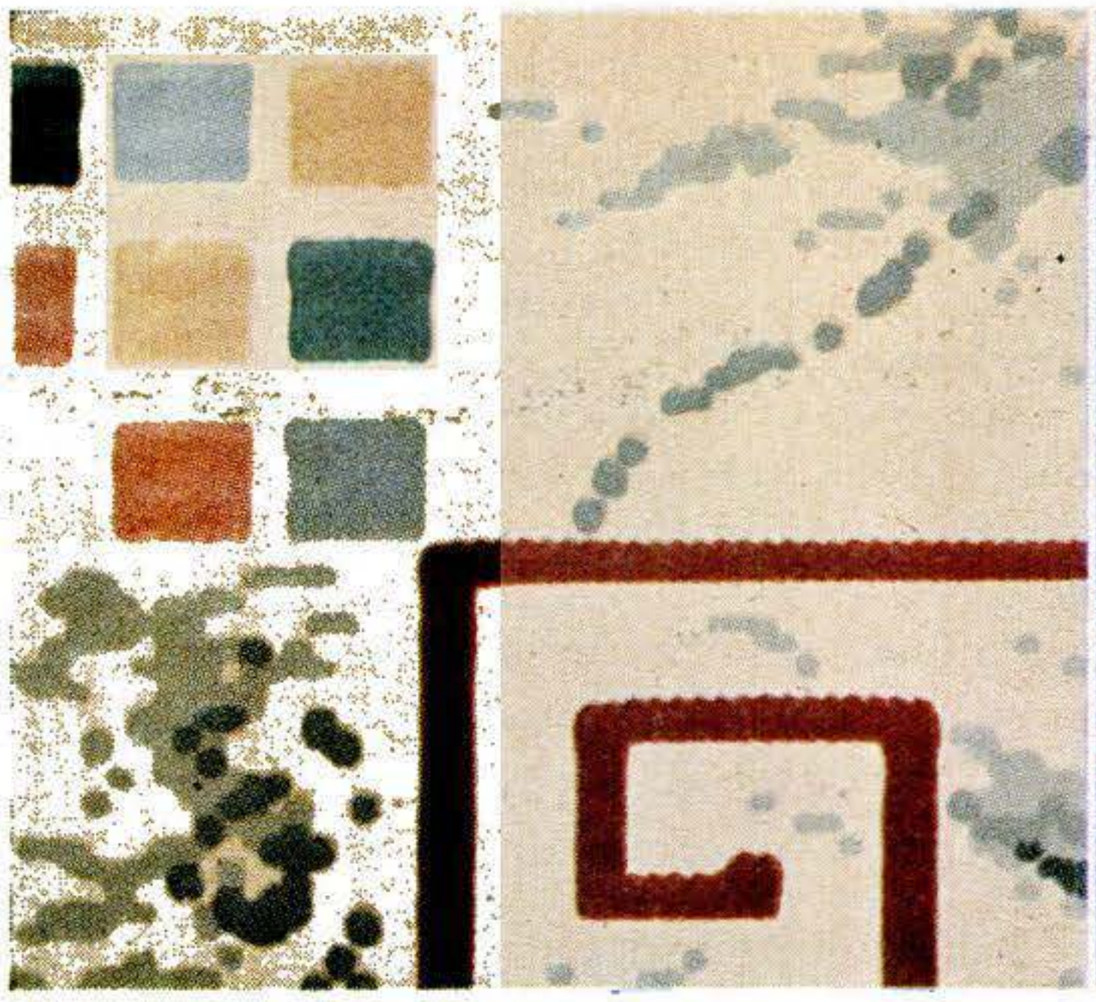


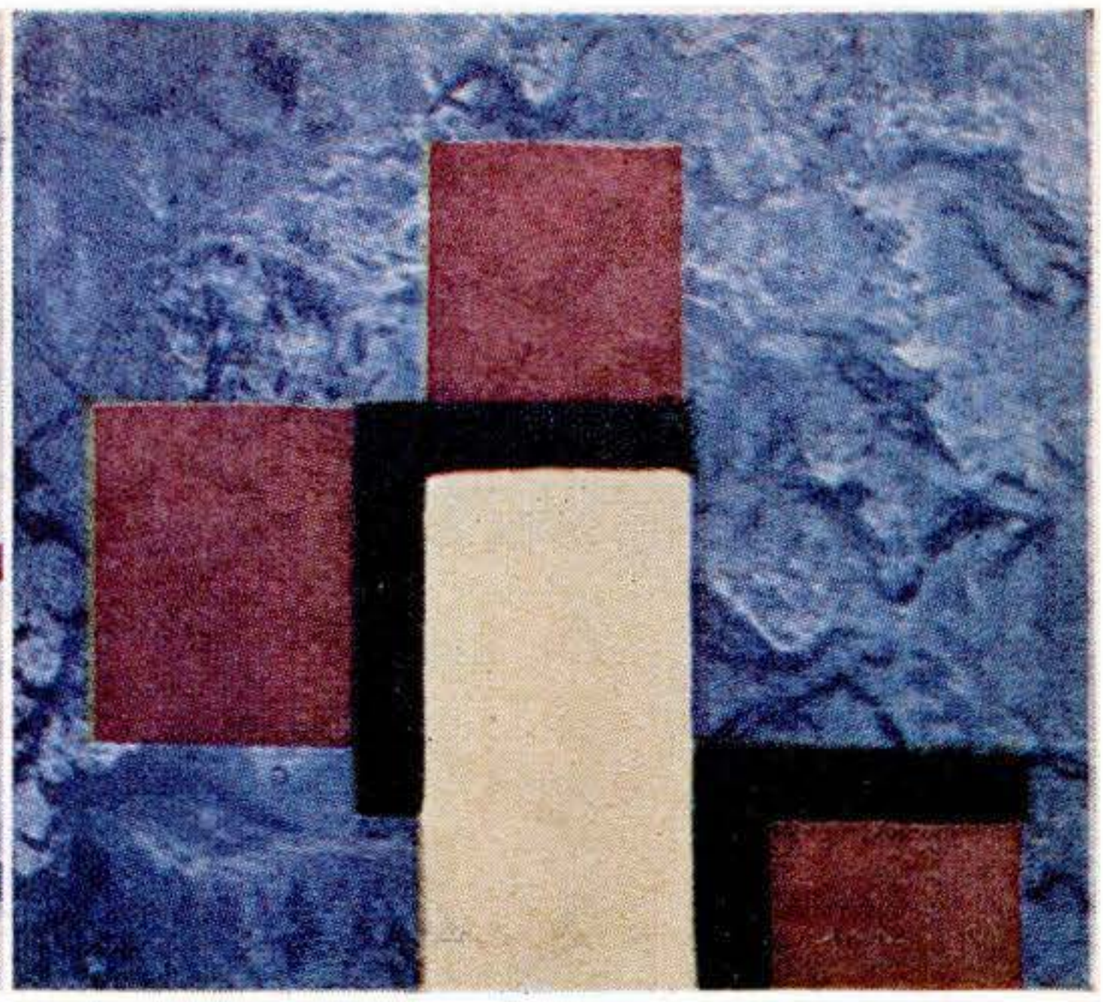
Portable Coolers. Perhaps the principles of an immersion heater and electric refrigerator could be combined in a compact gadget to cool a container of drinks. You'd just immerse the cooling coil.—*Irene Treece, Artesia, N. M.*



Fans You Could Disconnect. Car engines would warm up sooner on cold mornings if you could disconnect the fan or vary the pitch with a dash control. A thermostat also might do it automatically.—*P. Hubschmitt, Paterson, N. J.*

Copyrighted material





Which is linoleum? You've walked on these two floor coverings many times. One is linoleum, the other felt-base flooring. Can you tell them apart? See illustrations below for the answer.

How to Look at Linoleum

This backstage visit to the Armstrong factory tells you what you should know in order to buy floor covering wisely.

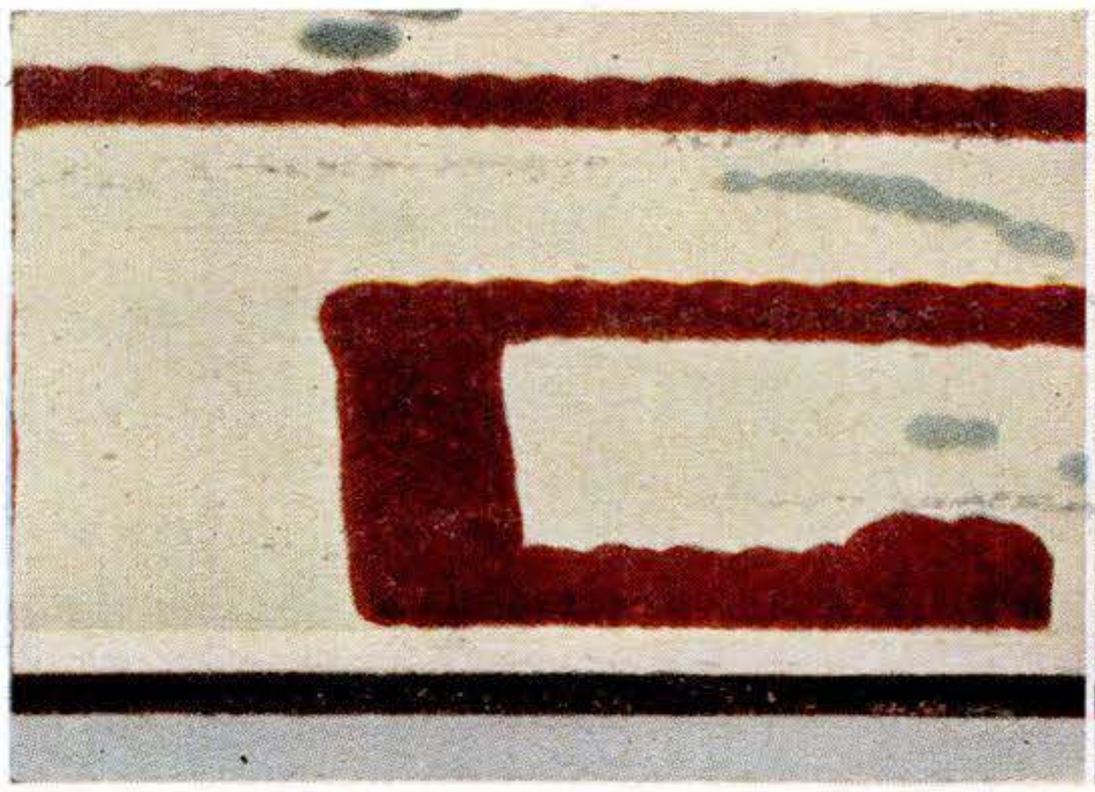
By George H. Waltz, Jr.

PS photos by W. W. Morris

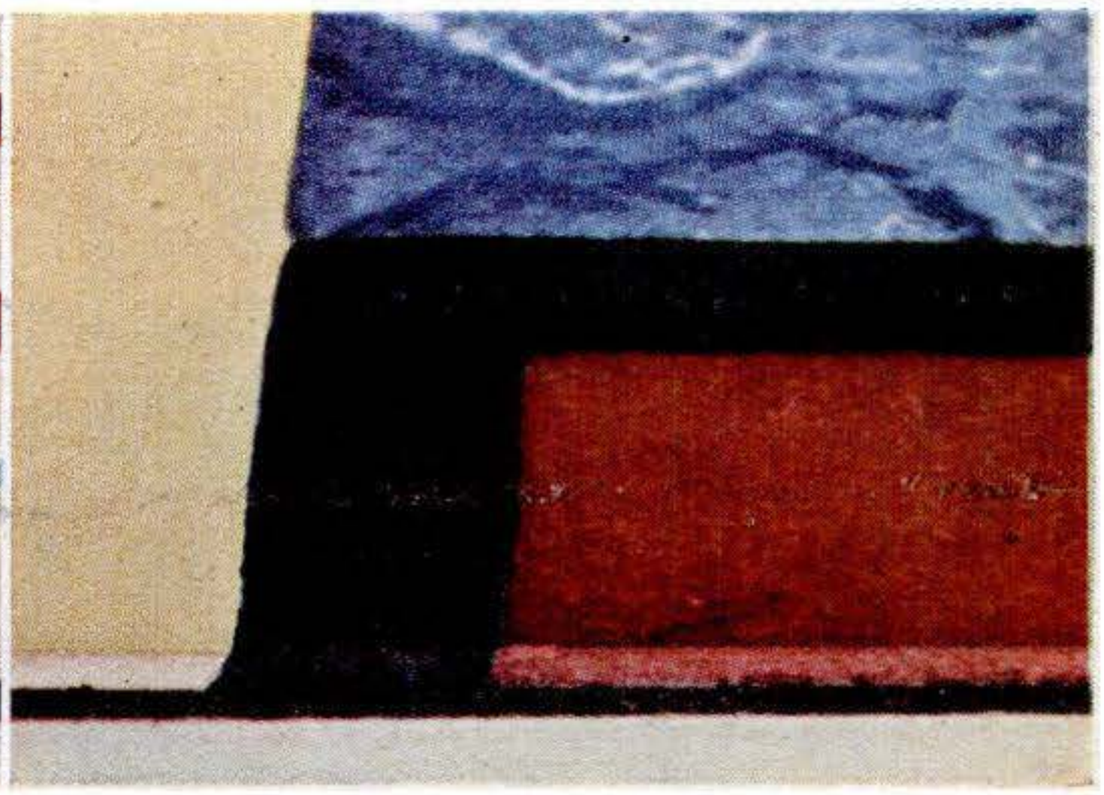
HOW many times have you glanced down at the smooth, colorfully surfaced floor of some neighbor's kitchen and thought "linoleum"? If you live in a typical American community, your offhand snap judgment has probably been wrong half the time. Not all that glitters underfoot is linoleum.

"Linoleum" is probably one of the most frequently misused words in our language. It is not a handy tag for any resilient floor covering. Neither is it a trade name. Linoleum is a specific label for a certain type of product. There are other types of colorful flooring. And each of them has distinguishable characteristics and its own peculiar and interesting advantages.

Most frequently confused with linoleum



This is felt-base floor covering. Notice how the colored design is just on the surface. Here the color has no thickness, but is simply "printed" on the felt base (black line at bottom).



This is linoleum. Notice how colors and design go right through the thick layer of material above the felt backing. Thus the design will last as long as the material itself.

Copyrighted material

is the printed felt-base type of floor covering. This can be bought in rug form or by the yard in a wide sheet. Felt-base is a colorful, low-cost covering that is easy to keep clean and wears well dollar for dollar—but it is not linoleum.

What's the real difference between linoleum and felt-base? How can the man of the house tell them apart? Why is linoleum more expensive?

To find out, Bill Morris, PS crack photographer, and I went to Lancaster, Pa., to tour the sprawling 110-acre flooring-division plant of the 85-year-old Armstrong Cork Company. Some 616 photographic flash bulbs, dozens of color and black-and-white films, reams of notes, and four very tired feet later we climbed back into the POPULAR SCIENCE editorial scout car with answers to these and a good many other questions.

Before we had traipsed far, we had learned the simple difference that can be detected by the untrained eye. Felt-base floor covering is a printing job much like the pages that you are reading. Replace the paper with a specially processed rag felt and the ink with carefully mixed, long-wearing enamel paints and you have a felt-base floor covering.

Linoleum, on the other hand, is more like the cloth in your suit in that the pattern is "woven" in. Hence, the design cannot wear off. The colors go clear through to the backing, and remain crisp and sharp as kitchen traffic scuffs away the surface over the years.

This major difference between linoleum and felt-base floor covering makes it easy to tell one from the other. When in doubt, look at the edge of the material. If the colors in the design go through from the top surface to the backing, it is linoleum. If all you can see is a thin layer of color on a thick black backing, then the material is felt-base floor covering.

There was a time when you could tell linoleum from felt-base simply by looking at the floor side of the material—linoleum was always backed with burlap. Now, with modern advances in the industry, felt is used as a backing for linoleums as well as a base for felt-base.

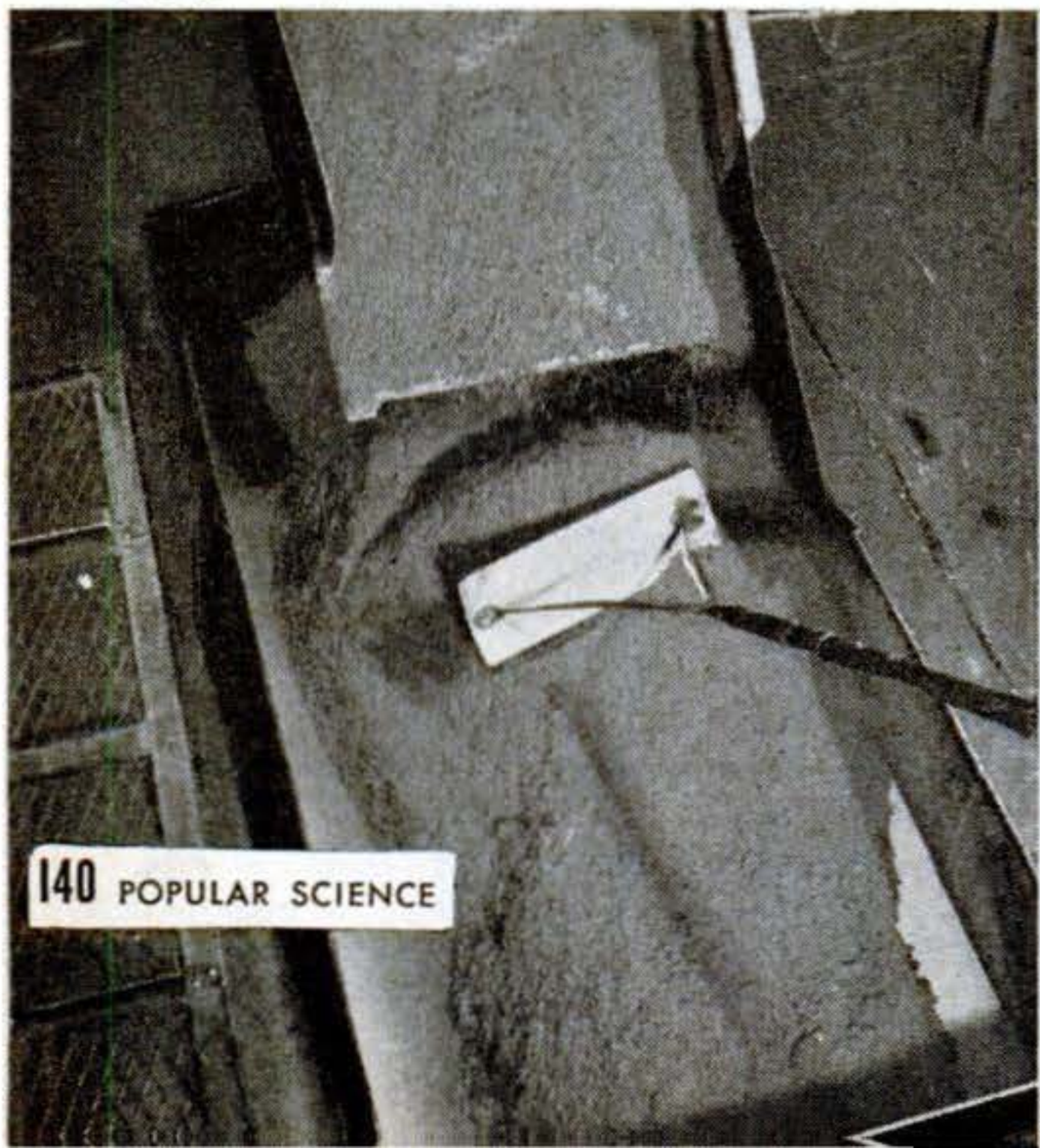
Flax and Oil

Linoleum comes by its name honestly. In Latin, *linum* means flax and *oleum* is the word for oil. Combine the two and you get flax oil or, more commonly, linseed oil, the main ingredient in linoleum as well as paint.

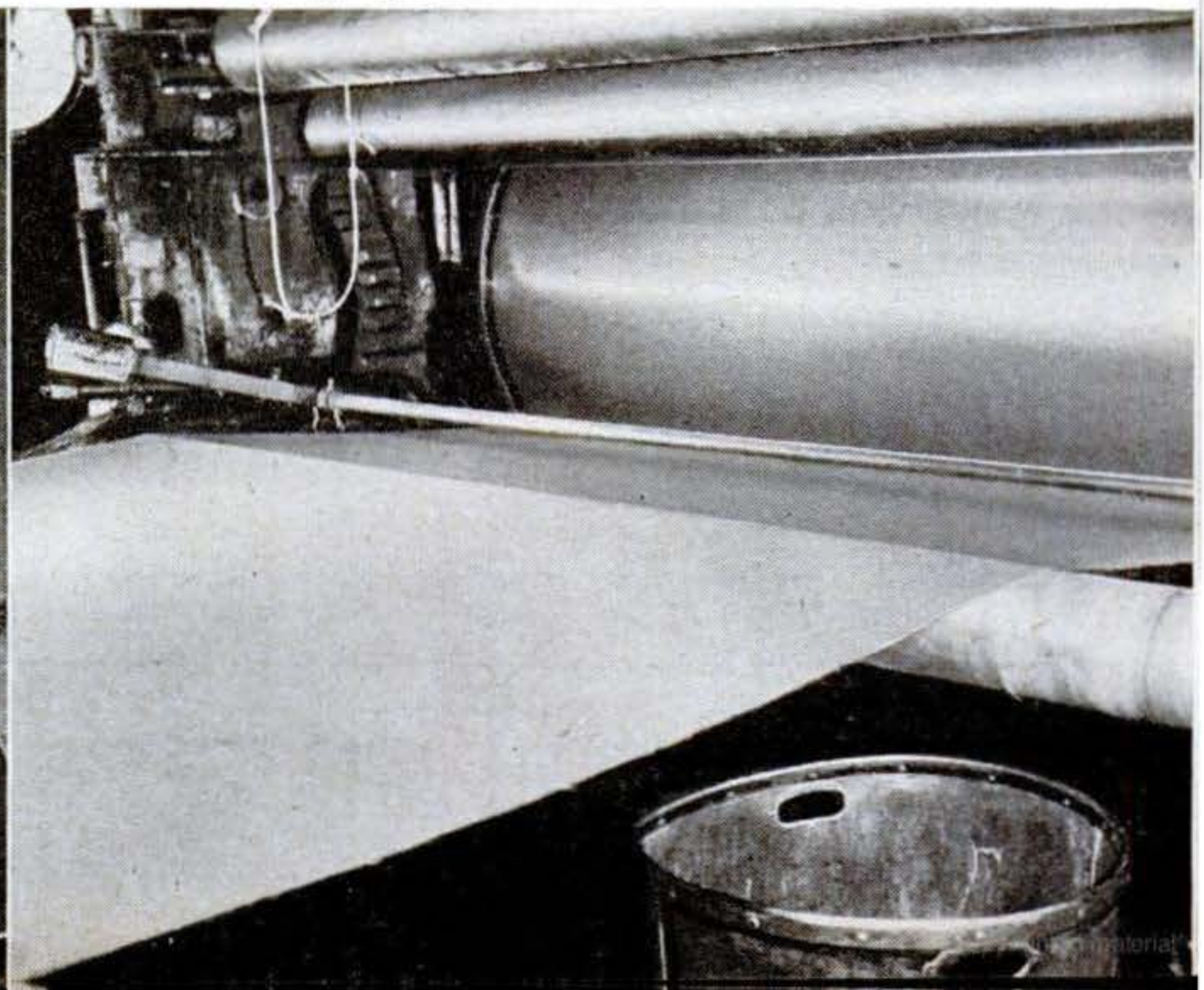
As a matter of fact, that bothersome tough scum or film that forms on the top of an old can of paint is the basis of all linoleum. It is oxidized linseed oil. This, mixed with wood flour or ground cork, color pigments, and powdered limestone, forms the basic linoleum mix or "batter" that is spread out on the felt or burlap backing and bonded to it with heat and pressure.

Of the five main types of linoleum—(1) plain, solid color, (2) jaspe, (3) marbelle (marbleized), (4) straight-line inlaid (the tilelike and inlaid-design types of patterns), and (5) embossed—the plain is the simplest to manufacture. The mix is fed directly into the open hopper of a machine that resembles a giant clothes wringer and is called a "calender." One of this machine's two slowly

Making plain linoleum. The linoleum mix is first fed into the hopper of a big calendering machine. This mix contains cork flour, limestone, pigment, and oxidized linseed oil.



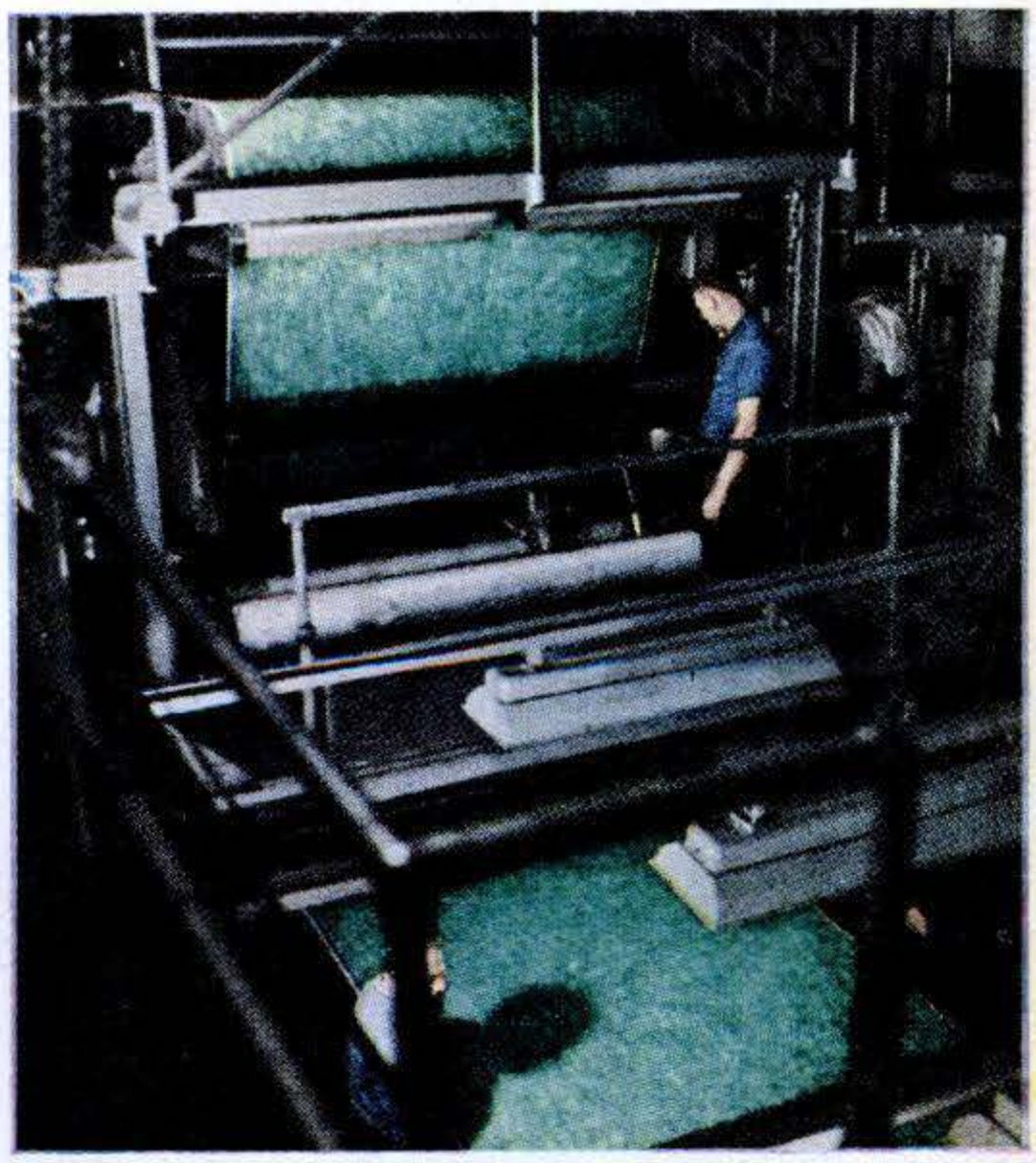
Like a giant clothes wringer, the two cylinders of the calendering machine spread the mix out on the backing in just the right thickness to make the gauge of linoleum desired.



Linoleum mix. Most linoleums are made from linseed oil (center) which is oxidized, wood flour (left), pigment (front), and powdered limestone (right). Thoroughly mixed, these ingredients form the basic linoleum "batter."

Making marbleized linoleum. After repeated mixing and re-mixing, the "batter" is fed into the first of two calendering machines. The thin split sheet shown emerging from machine is the result of the first rolling.

Second calendering. Here the sheets, cut into six-foot sections, are fed, one on top of another, into a second calendering machine. This forms a continuous linoleum strip.



Miles of colorful linoleum emerge from the second calendering machine. At this point in the process the endless linoleum strip meets its backing and is bonded to it under pressure.

Copyrighted material

revolving steel rollers is heated and the other is cooled. As the mix is pulled in between these rollers, it is spread to the desired thickness. And at the same time the mix is bonded to a continuous strip of felt or burlap backing.

From the calendering machine, the finished linoleum goes to one of 26 huge vault-like maturing stoves. Here it may hang up to three weeks for aging. Each of these maturing stoves can hold a festooned strip of linoleum 17 miles long!

In the heavier gauges or thicknesses, and in the darker colors, plain linoleum is known as "battleship linoleum." It is the kind you see mostly in offices and public buildings where the traffic is heavy and a tough, long-wearing floor covering is needed. Battleships, incidentally, don't use it anymore, bare steel being less combustible.

The more intricate linoleums require a more complicated manufacturing process. Let's follow a batch of linoleum mix down through the seven-story building that houses the big rotary linoleum press that turns out more complicated patterns. At the time Bill Morris and I were there they were churning out a green and white marbleized pattern.

Working down from the roof to the street level, the upper four floors are taken up with a continual mixing and remixing of the oxidized linseed oil, color pigments, wood flour, and limestone. This churning is necessary for a thorough blending of the mix.

On the building's third floor the linoleum first begins to take shape as a sheet. From the last of the mechanical mixers and blenders, the mix is fed into the first of two calendering machines that are much like the one used in the manufacture of plain linoleum. This first rolling produces a continuous narrow strip of linoleum that is marbleized in one direction.

This strip then is automatically cut up into short sections, which are fed by hand crosswise into the second, and larger, calendering machine. The pressure and heat of this calender's rollers complete the marbleizing of the pattern. At the same time they press the sectional strips together into a homogeneous and continuous six-foot-wide ribbon of linoleum. On the ground floor, this linoleum ribbon meets the continuous strip of backing and is bonded to it with the aid of further heat and pressure.

Rotary Machine Does Quick Job

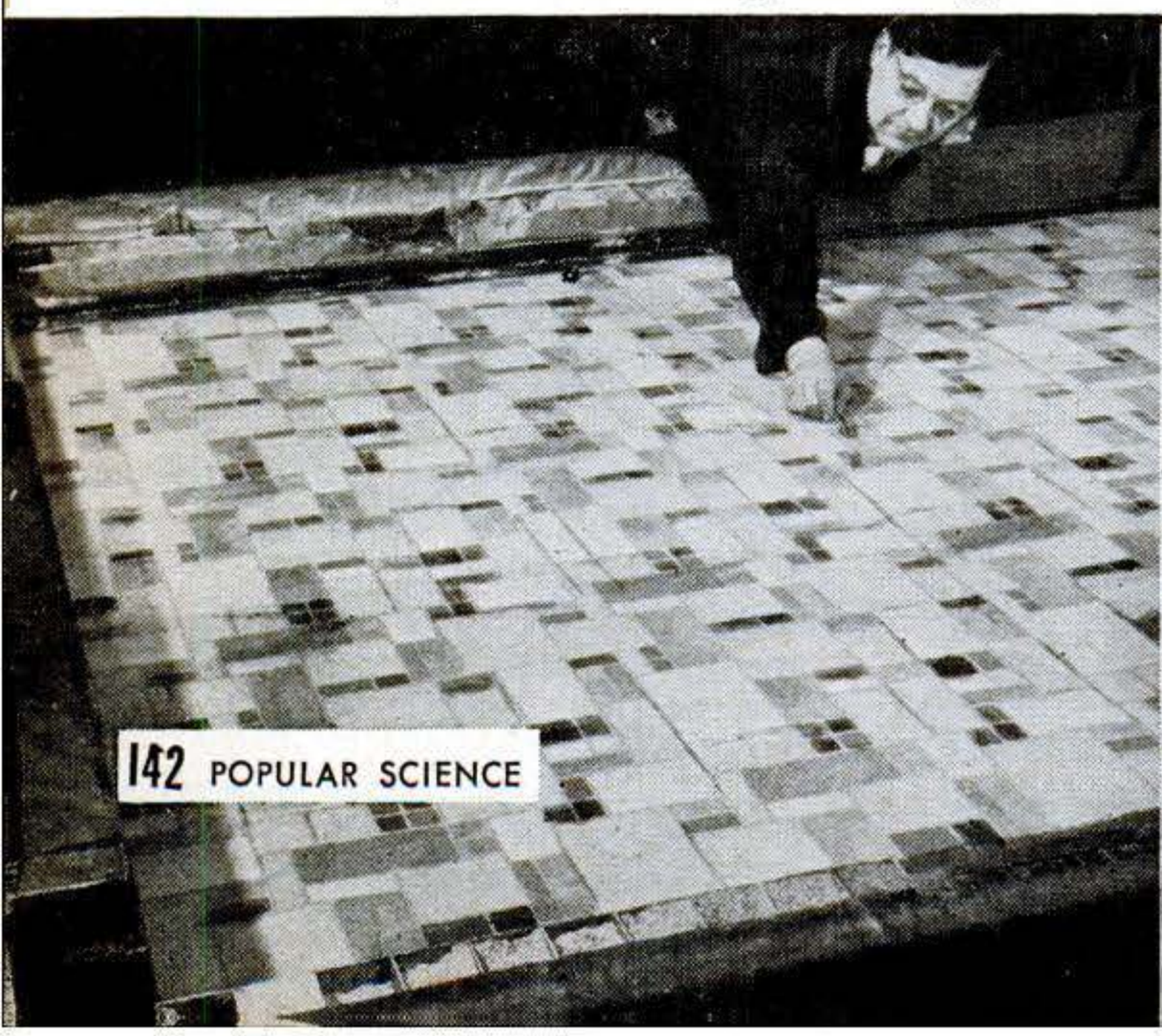
By using an additional section of this huge linoleum-making machine, the complicated straight-line inlaid patterns can be made. This additional part consists of a giant drum on which automatically cut blocks and designs of the various colors are placed and fitted together like the pieces of a jigsaw puzzle to complete the over-all pattern. Years ago, this type of linoleum had to be cut and assembled by hand. Now, the rotary machine does it quickly and accurately.

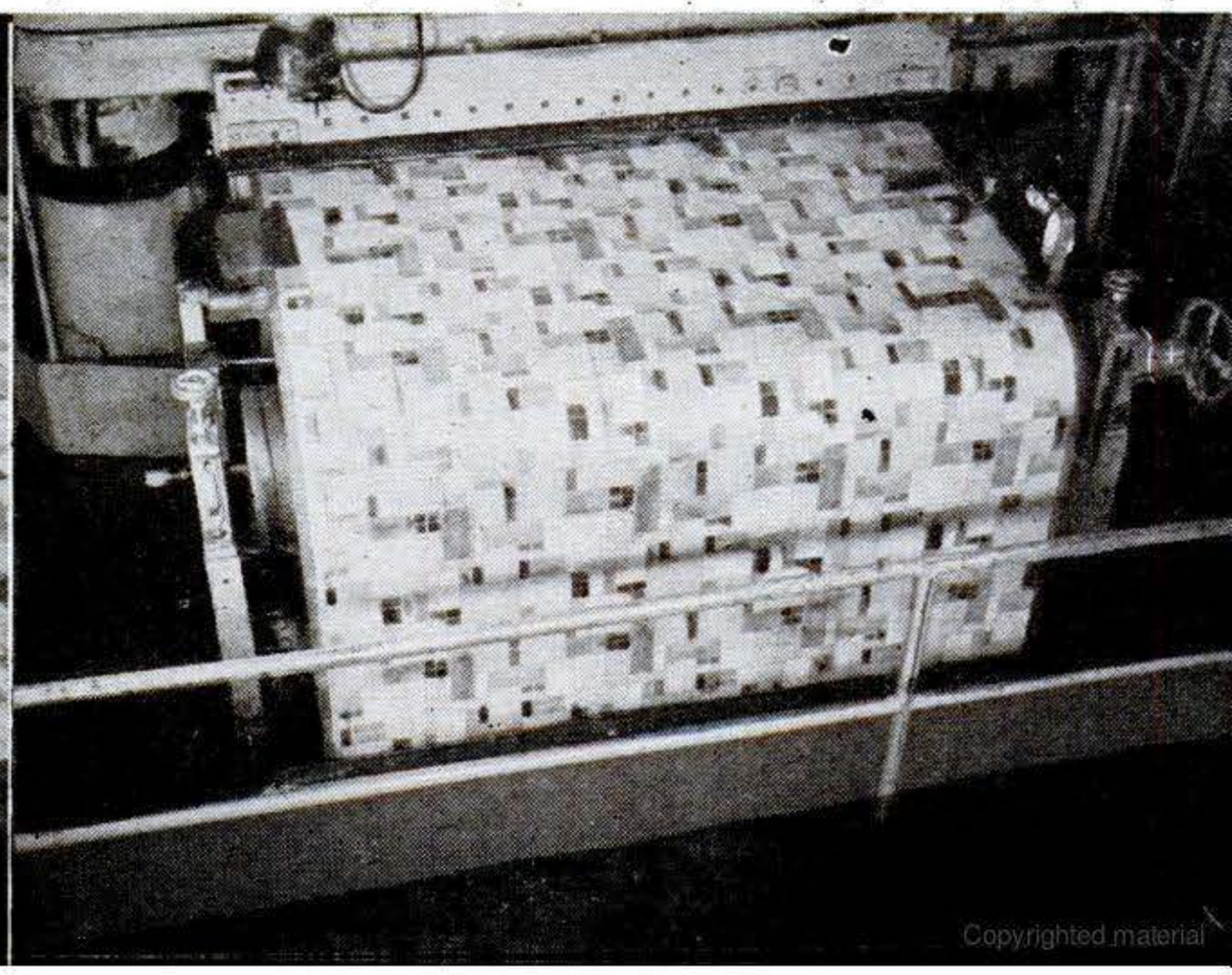
Running at top speed, and on a simple design such as a marbleized pattern, this press in a very short time can turn out enough linoleum in a continuous strip to pave a straight path from New York City to Trenton, N. J., or almost enough to stretch from Cleveland, O., to Detroit, Mich.! And all this comes from only one machine in one plant turning out many different kinds of linoleum.

Another and different process is used in fabricating embossed linoleum. This type is

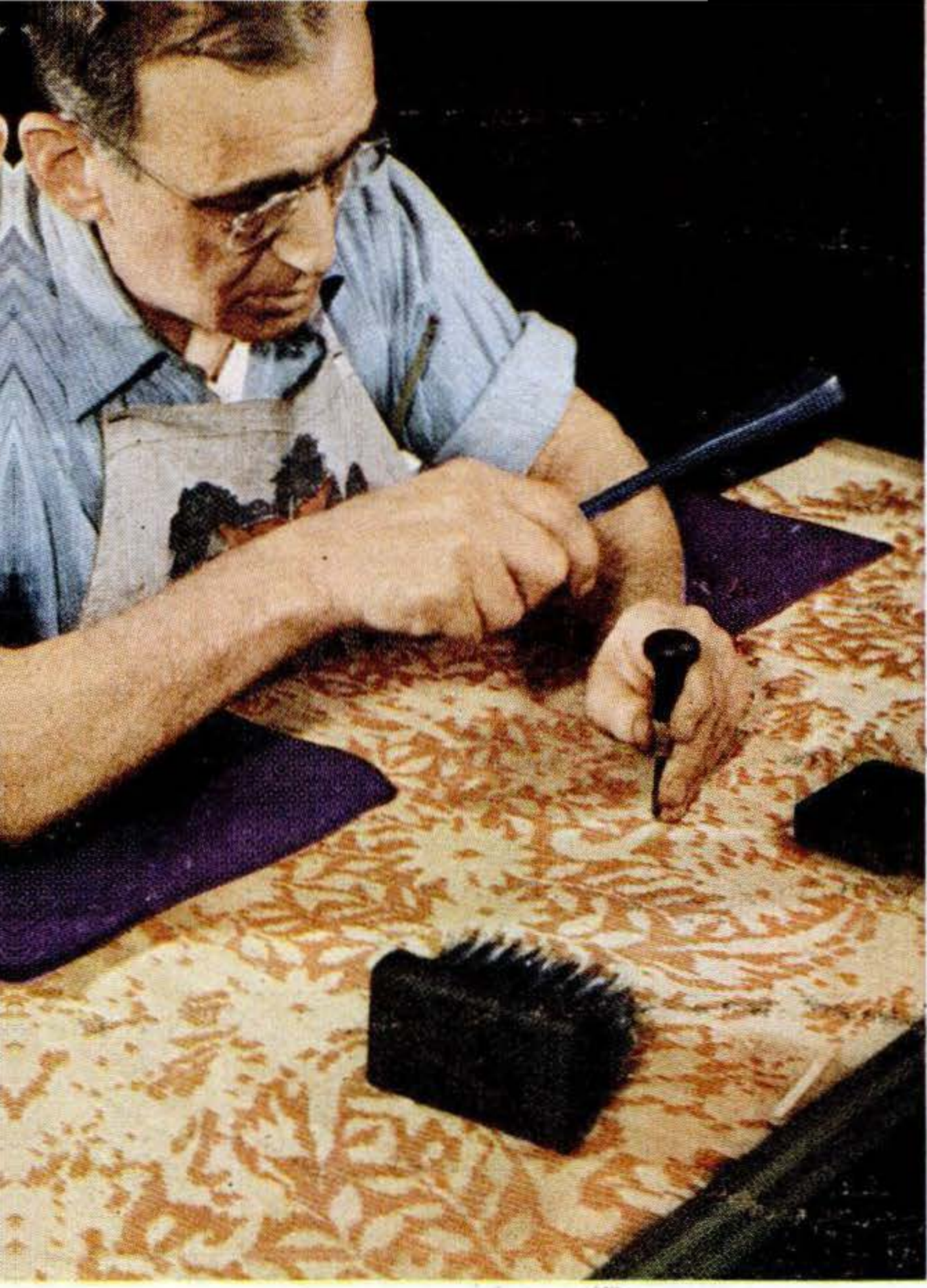
Embossed linoleum is made by sifting powdered linoleum mixes through metal stencils cut out to form the various parts of the design. Here an inspector is checking the design.

Pressure and heat provided by a giant hydraulic press then solidify the powdered mix and bond it to the backing. Here another press is shown pressing in the embossing.



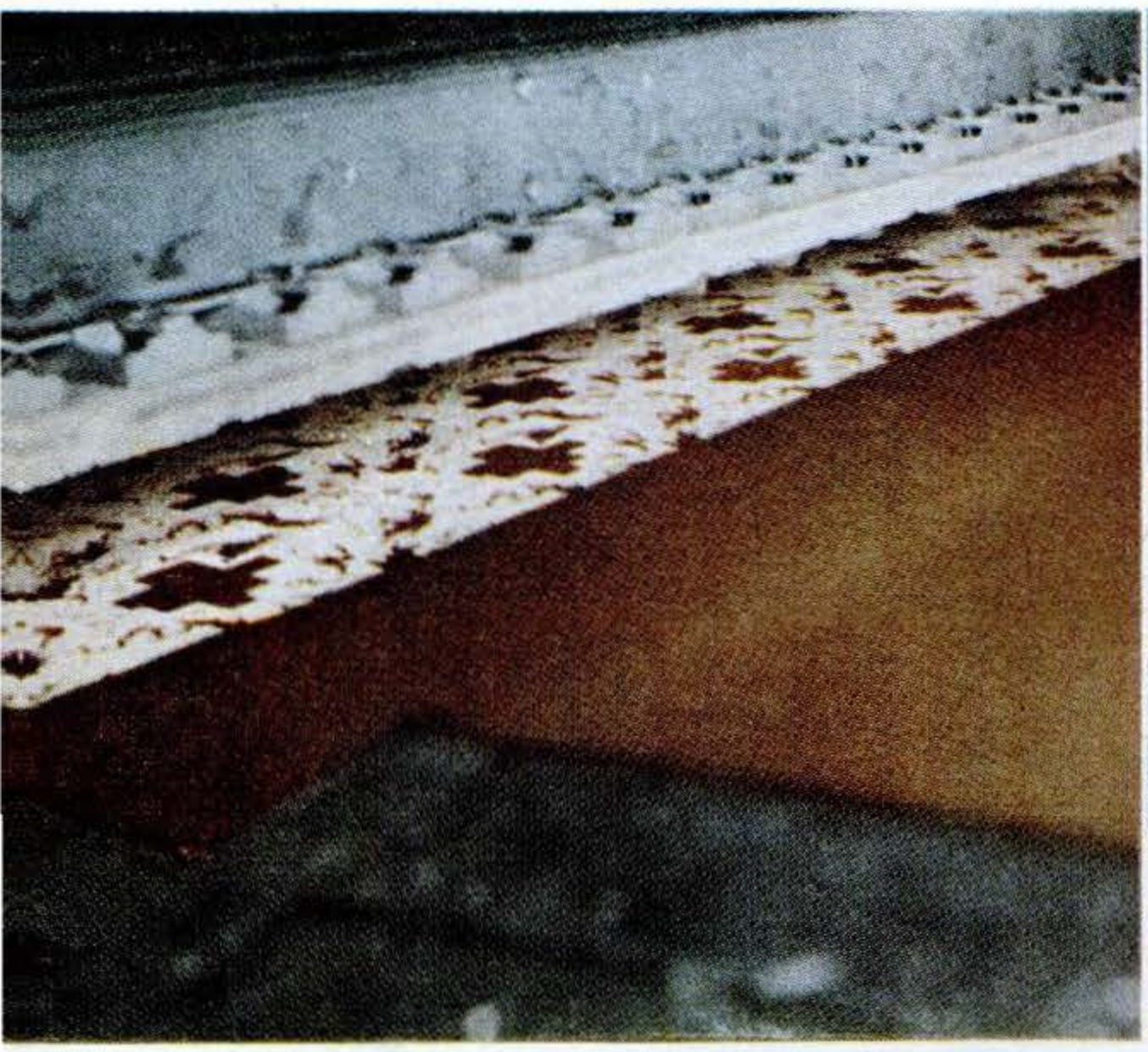


Copyrighted material



Felt-base floor covering is made by a printing process. Here a skilled workman is carving one of the many woodcuts that are used to apply the paint pattern to the felt base.

Start and finish. At the right is one of the carved woodcuts that helped to print the colorful mottled background of the finished felt-base floor covering shown at left in picture above.



Printing. In this photo, the first of a series of printing heads on which the woodcuts are mounted has applied the basic paint design to the felt that is going through the press.

Printing heads, picking up paint from individual wells, apply the colors to the felt one after the other. When the colorful design has been completed, it is dried in enormous stoves.

Copyrighted material

formed by sifting or brushing the various colors of finely powdered mix through a progressive series of metal stencils to build up the desired design as the backing material moves along a long flat bed.

The process is much like building up a multicolored picture with a child's stenciling set. Once the design is completed, the pattern in powder form is solidified by heat and tremendous pressure in a large hydraulic press. Another press, fitted with a die, embosses the pattern to provide a relief effect.

Felt-Base Is Printed

Just as making embossed inlaid linoleum resembles stenciling, the method for manufacturing the popular low-cost felt-base type of floor covering resembles printing. Specially treated felt is fed into a long flat-bed press. Here a series of printing heads, each fitted with a hand-cut wood block reproducing a part of the design, applies one color after another until the pattern is completed. The felt-base strip moves through the press in a series of stops and starts as the various printing heads pick up the colored enamel paints from rollers and then move down to print them on the treated felt surface.

In the color photographs that illustrate this article, three colors and black were used on the printing presses to produce the natural full-color effects. As many as 23 different colors can be used to build up the design in felt-base rug or sheet. When rugs are produced, they are printed in one continuous strip. They are cut into individual rugs after being thoroughly aged in the maturing stoves.

When you watch linoleum and felt-base rugs literally roll off the lines in this big plant, you are likely to wonder where it all goes. There just can't be that many floors. Yet, it has been estimated that in 1948 the floor-covering industry of the United States will turn out at least 22,000 miles of linoleum and 85,000 miles of felt-base floor covering—without meeting the consumer demand. That's just about enough floor covering to go around the earth at the equator four times! END

Tips on Floor-Covering Care

THE best way to care for your floor coverings, whether they are the linoleum or the felt-base type, *is not to kill them with care.* Don't use strong or gritty soaps. Don't scrub them to death. The woman won't believe you, but the makers say, "the less washing the better."

Clean the covering once and for all with a mild soap. Then wax it. Give it repeated waxings at least once a week.

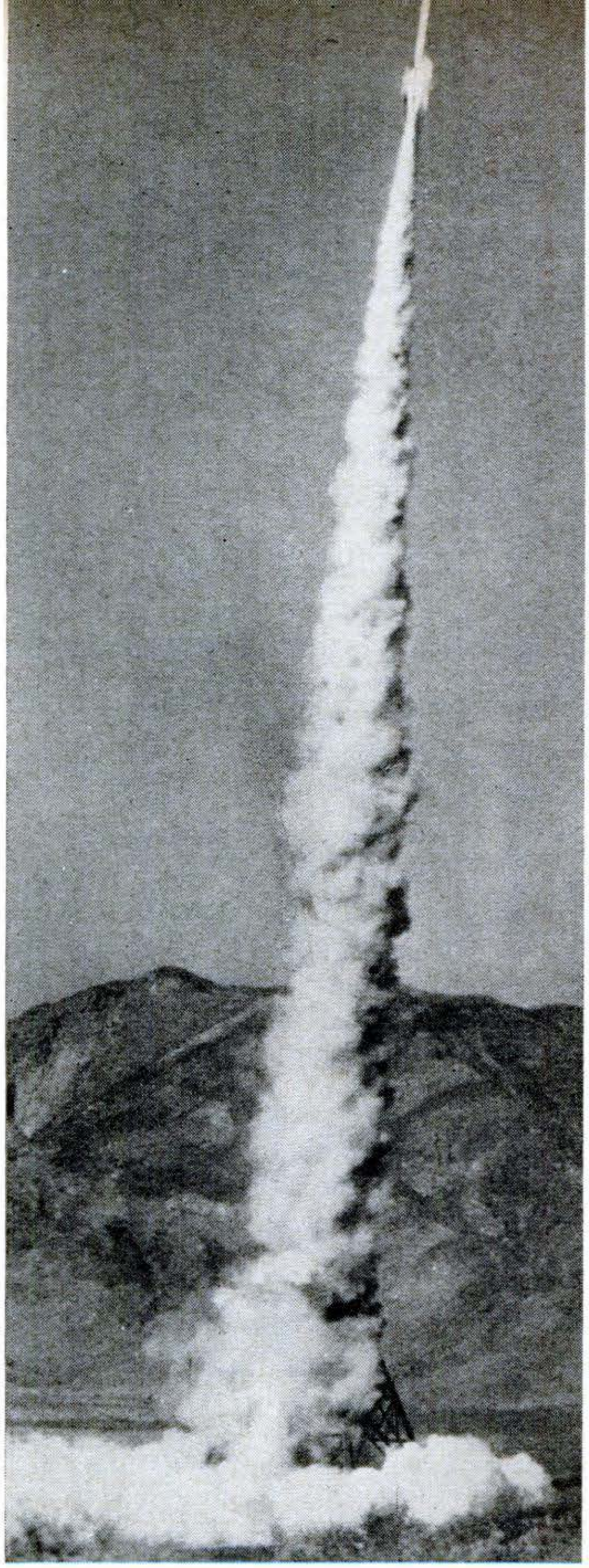
When you spill something, wipe it up immediately. If you keep your linoleum or felt-base well waxed, a daily sweeping or dry-mopping will keep it spotless. If this fails to remove all the dirt, wipe the floor with a damp cloth or wrung-out mop and then apply more wax. Wax, not soap, is the secret of long wear and good appearance.

Nitrogen Shrinks Metal

IF A metal part is too big to fit into an assembly, a bath in liquid nitrogen chills it to 320° below zero F. and reduces the size. For handling small parts this way, the Linde Air Products Co. has developed the stainless steel bucket shown at right. The liquid nitrogen is contained in a well-insulated inner receptacle. The object to be treated is placed in a perforated ladle and dipped directly in the liquid bath through a hole in the wooden cover.

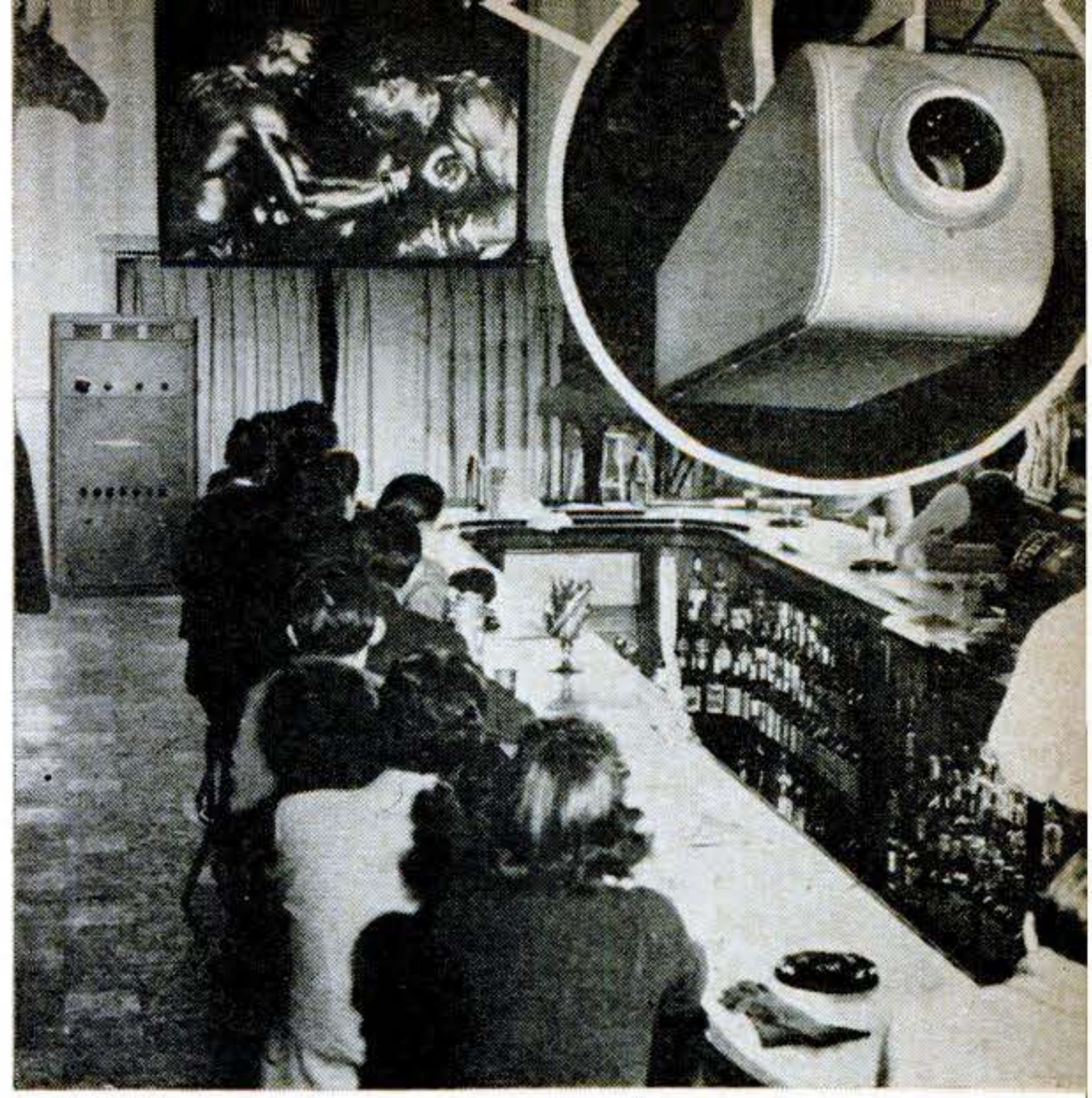
The process is especially recommended for such parts as valve-seat inserts, cylinder liners, and bushings where it is difficult to expand the outer member of an assembly. The company has made liquid nitrogen available in large quantities, and has developed various other machines for its use.

Copyrighted material



Aerobee Soars 78 Miles

THE Navy's latest rocket, above, set a new record for made-in-America missiles on its first trial, reaching a 78-mile altitude and a 3,000-m.p.h. speed. Called the Aerobee, it is designed to carry instruments for research into the upper atmosphere rather than for military use. The new rocket is simple and inexpensive to build, and a small crew can fire it without complex launching gear.

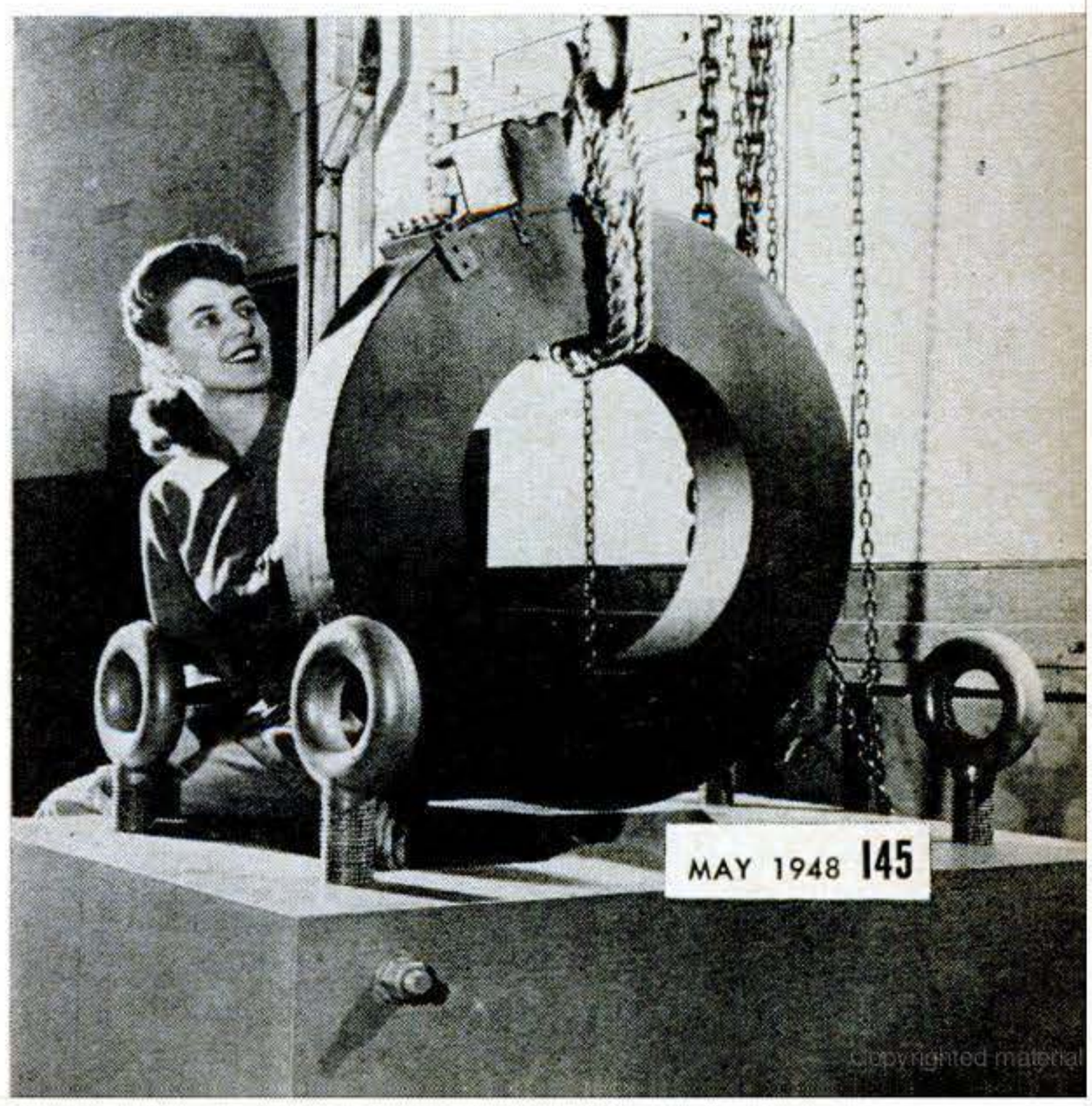


Tele Goes Movie Size

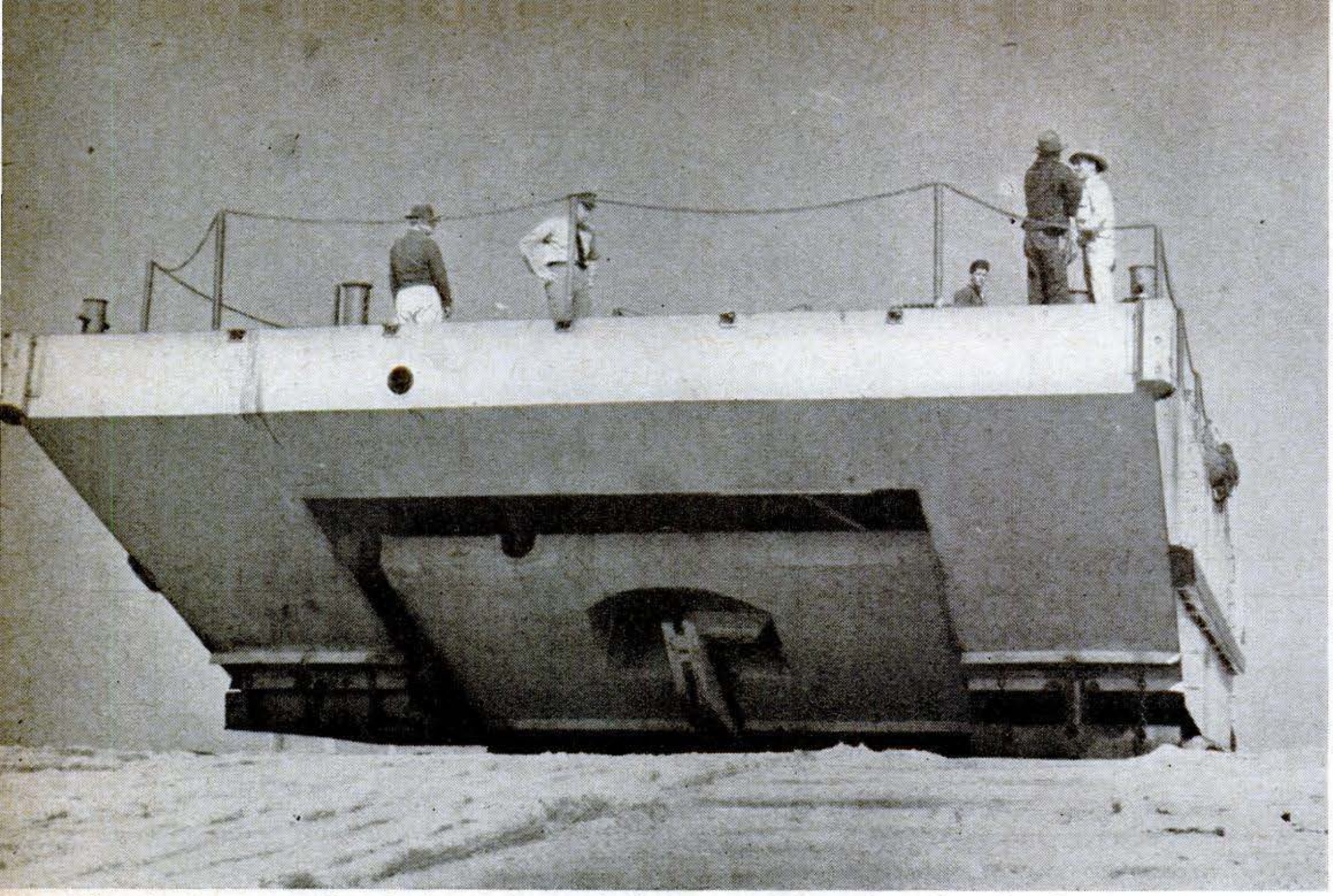
TELEVISION pictures as big as movies will soon be seen in theaters and taverns equipped with a new type of projection television system. It uses a small, very bright cathode-ray tube and a special projection lens in a ceiling-mounted unit to throw pictures as big as 6 by 11 feet on an aluminum screen. The receiver, built up of plug-in subassemblies, can be located away from the screen. It was developed by Tradio, Inc.

New Magnet Makes Cold

LARGEST and most powerful of its type, a new six-ton electromagnet will shortly be aiding low-temperature research at Rutgers University. Its strong field will actually remove heat from materials being studied under extreme cold near absolute zero,-460°F. If used for lifting, it could raise 13 automobiles, report the GE engineers who built it.



Copyrighted material



Lumbering up a beach, barge has tucked its propeller into well in center pontoon, which is 16 feet wide and 44 feet long. Outer pontoons are 6 feet wide, 60 feet long, and 9 feet high.

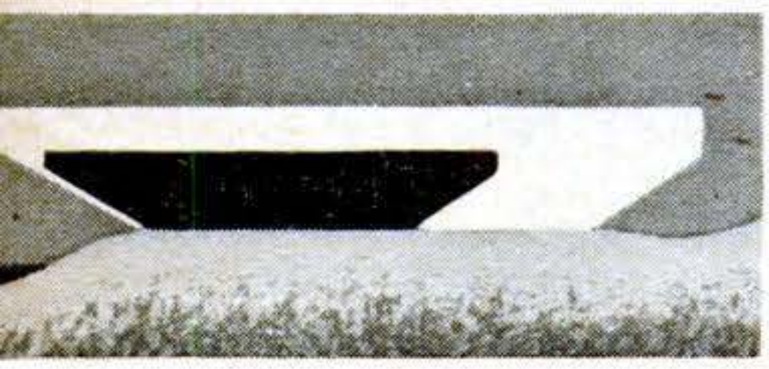
Leapfrog Barge Swims, Walks, Climbs

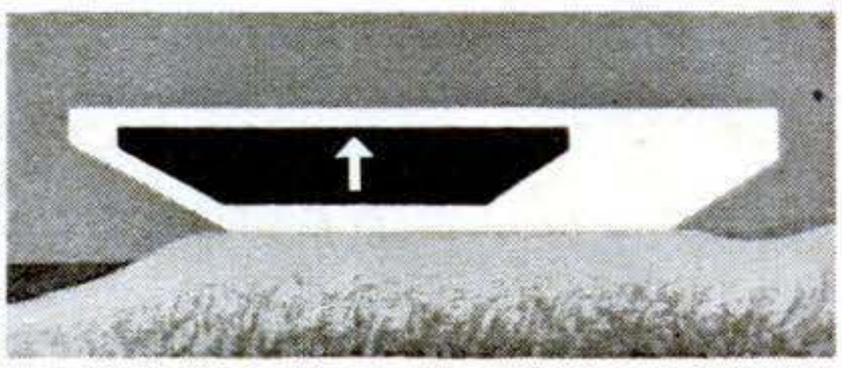
NEITHER surf nor sand dunes can stop the Navy's newest amphibious vehicle, a "walking" barge with a leapfrog gait and pontoon legs. Carrying a 60-ton load, it lifts itself by its own bootstraps over mud flats, banks, and beaches. It can even climb a six-foot wall.

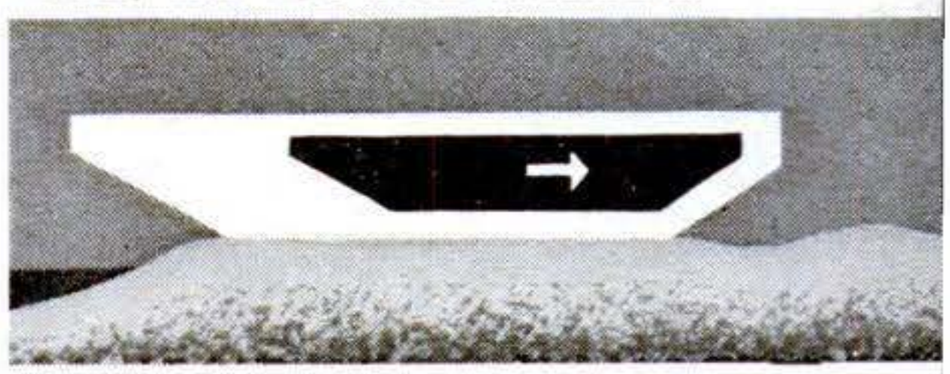
A single stern propeller, driven by a power take-off from twin Diesel tank engines, propels the barge in the water. When it reaches shore, the propeller folds up out of harm's way, and the huge craft starts to walk on the three compartmented pontoons that form its hull. For each ponderous step, the center pontoon is lifted 17 inches and moved forward 10 feet; then the outer pontoons, which are decked over to carry the load, move upward and forward in turn, as illustrated below.

Hydraulic steering pads at the rear of the outer pontoons provide sufficient pivotal drag to turn the 60-foot barge in little more

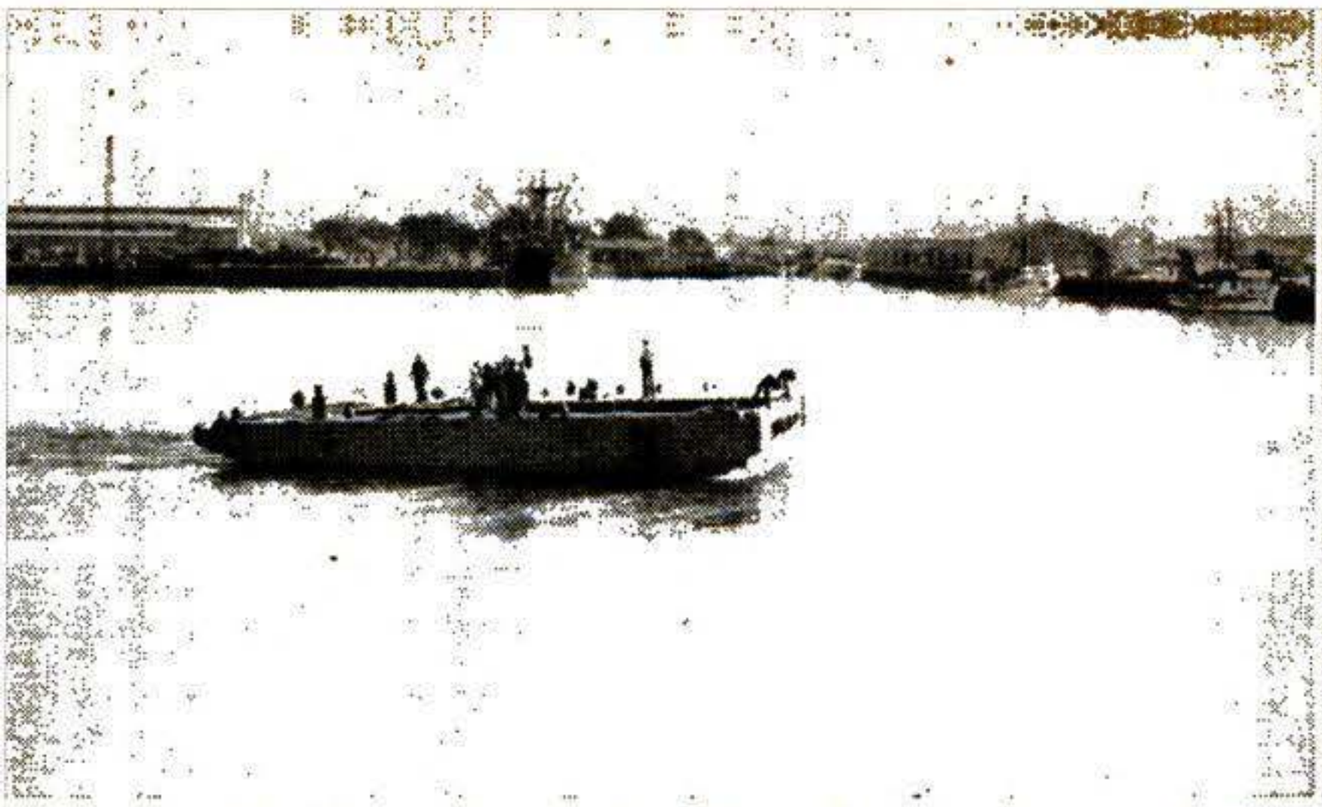
How the barge walks: A step begins with all three pontoons on the ground, the center one in its rearmost position. The first movement raises the center pontoon—its bow lifts first, then the stern—and the next one rolls it forward 10 feet between the outer pontoons. The driving mechanism is secret, and the barge's speed, on land or in the water, has not been disclosed.







Copyrighted material



Heading for a landing. barge shows off its broad, flat deck—ideal for speedy handling of heavy cargo. Inventor has suggested building houses on the deck for use in the Arctic.

Barge uses propeller (which can be set at various angles) as far up the shore as possible before starting to walk. Outbound, it reverses process and walks as far as it can.

Balancing act on a sand dune illustrates the barge's stability. Walking mechanism, operated by one man below decks, gives the 60-foot craft two speeds forward and one reverse.

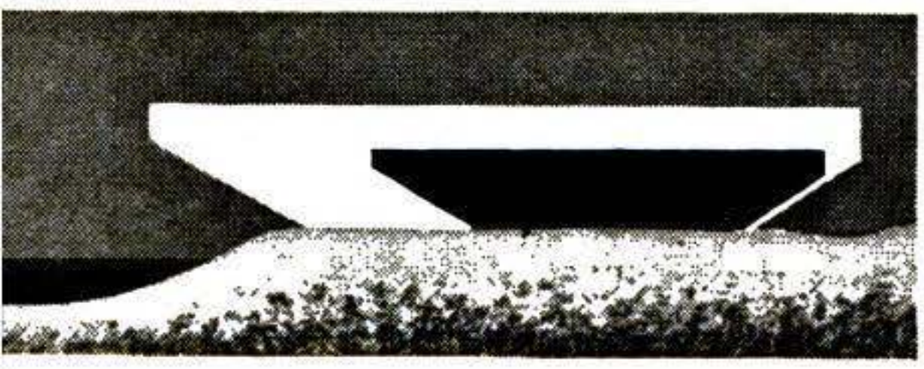
Overhang at bow and stern enables barge to hoist itself, step by step, over obstacles like this six-foot wall, although pontoons rise only 17 inches in making a single step.

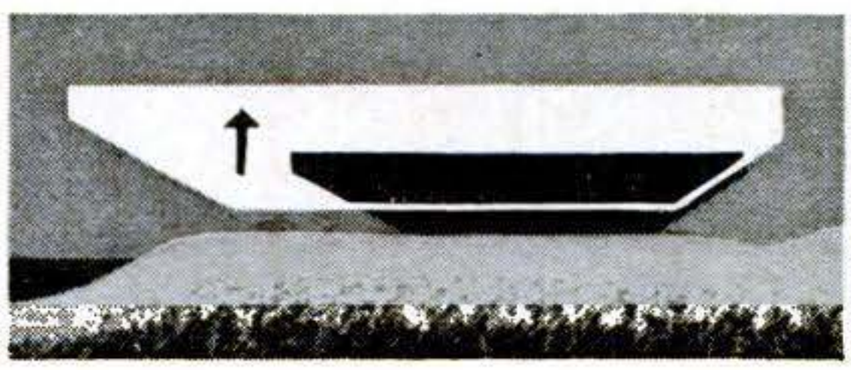
than its own length. In the present model, vertical fins in the forward sections of all three pontoons insure traction in mud.

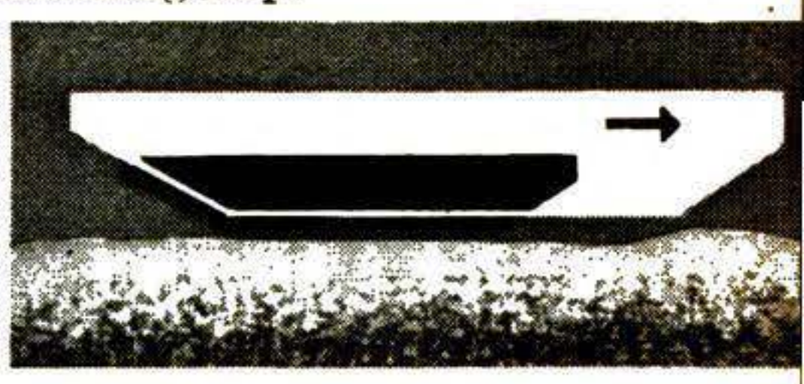
The barge was designed by John T. Tucker, superintendent of the Navy's proving ground at Port Hueneme, Calif., where it is being tested. He believes that his steel leapfrogs, built in many sizes, may change the whole concept of amphibious landings and ease the problems of setting up military outposts at remote points.

The uses suggested for the craft support his belief. Carrying stacks of sectional road mats, for example, the walking barges could string completed landing ramps or airstrips behind them. They would be useful in building bridges or piers. Armored, they could become mobile fortresses to cover troops making shore assaults. In the Arctic, where impassible ice gives way to impassible bogs when the tundra melts, the barges could provide year-'round, heavy-duty transport.

When the center pontoon reaches its forward position, it is lowered again to begin the second half of the step. Now the outer pontoons rise while the center one supports the barge's entire weight. Moved forward, the outer pontoons are ready to descend and put the barge back on "all threes" once more, center pontoon aft, ready for the next crunching step.

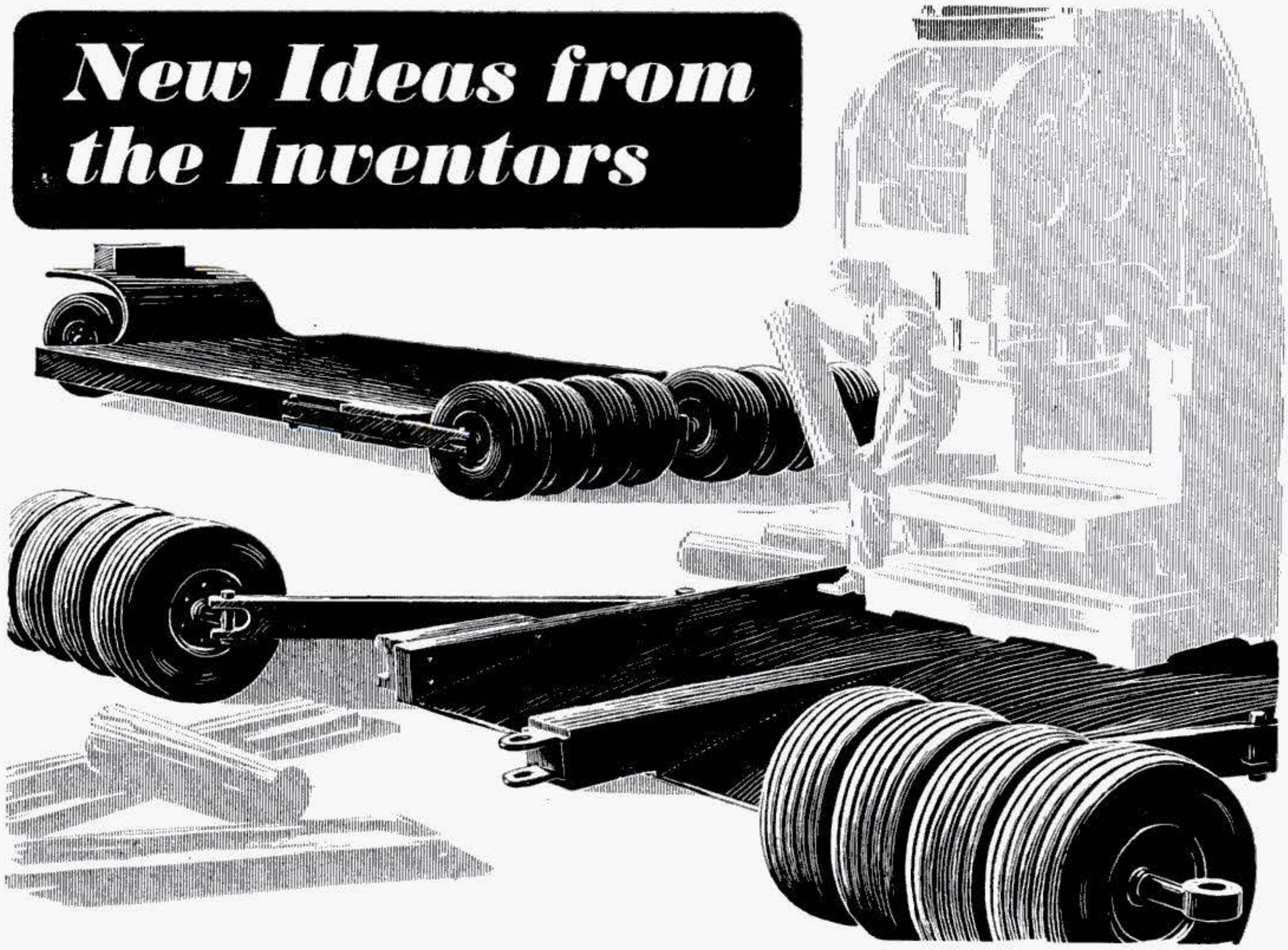






Copyrighted material

New Ideas from the Inventors

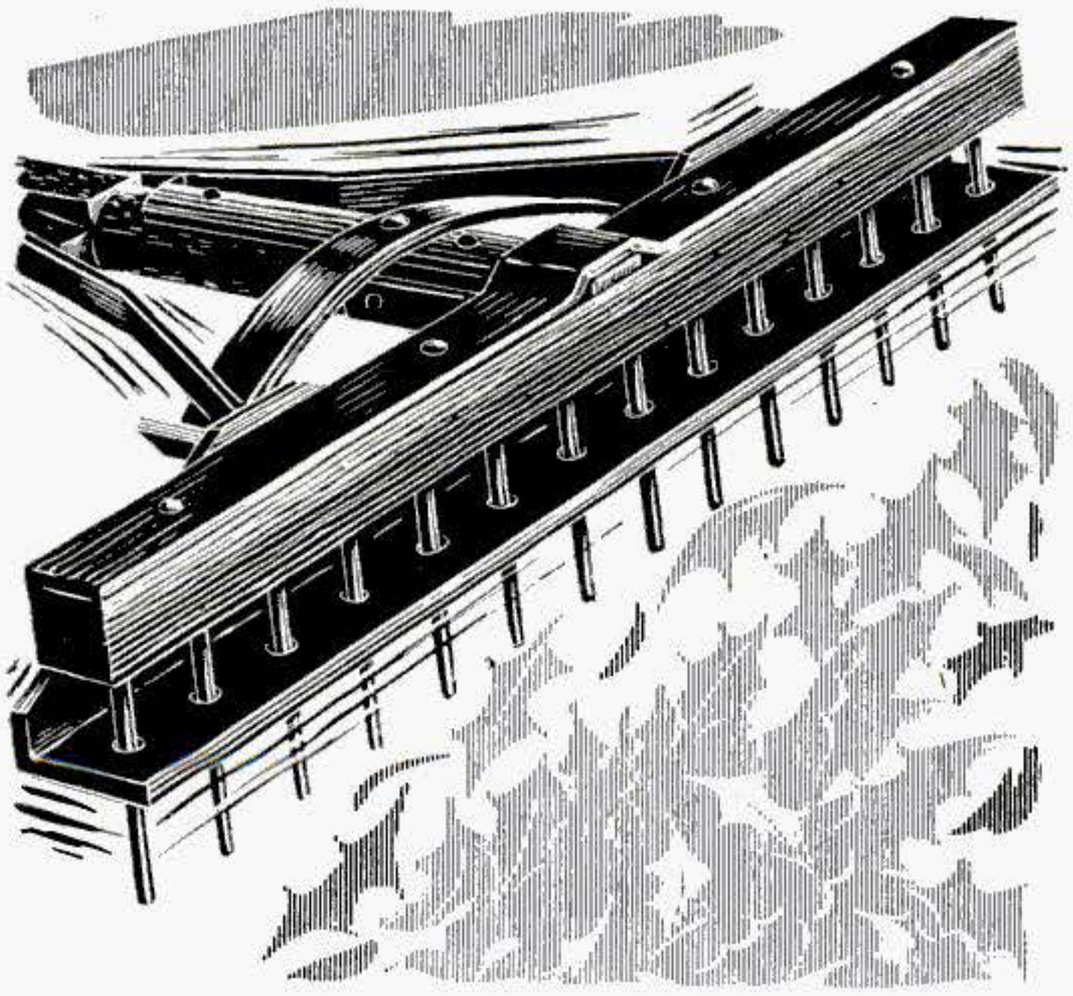


Trailer Sits Down. Loading would be no problem for users of the truck trailer patented by Benjamin Fitzpatrick, of Miami —it simply spreads its wheels and squats. The rear end is jacked up, and the divided axle, hinged at the sides and coupled in the middle, is swung out like a double door. The trailer's end is then lowered onto the ground.

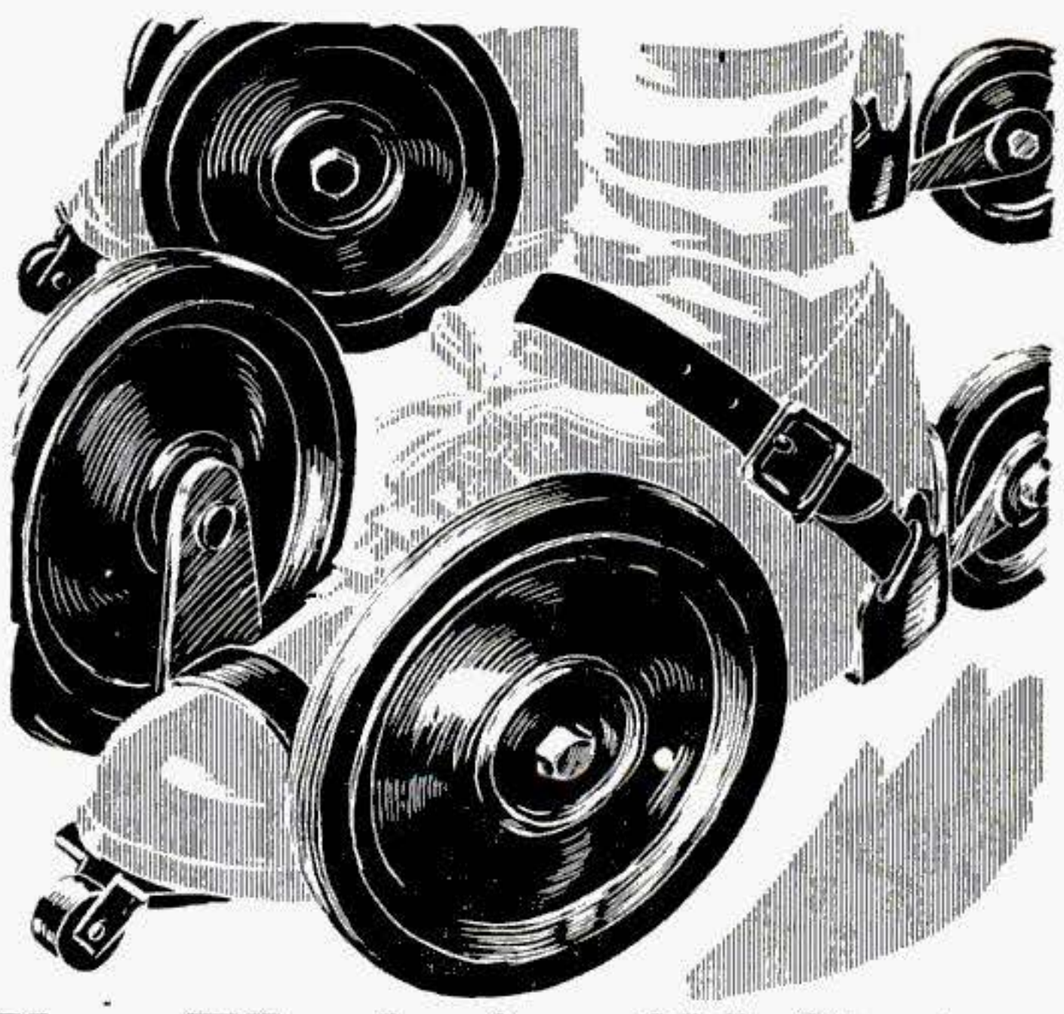
Lighted Float Lures Fish. To help entice the fish to his bait, Teddy Pope, of Memphis, has invented a float that holds a miniature battery and bulb and shines a tiny light into the water. A U-shaped guard protects the bulb from rocks and supports the bait. Another guard at top covers a switch and connects the float to the fishing line.

Useful Trimming for Pajamas. To keep unruly pajama pant legs pulled down neatly around the ankles without going into contortions to do it, Lillion and Anna Nahas, of Beaumont, Tex., have invented just the thing. Short straps on the bottom of the pant legs let you tuck in a toe and push each pant down with the other leg.

Fuel Tank Is Collapsible. This airplane fuel tank is always full. Designed to eliminate the explosion hazard of vapor in partially filled tanks, the accordion-sided wing tank collapses under its own weight as the fuel is exhausted. The perforated plate checks sloshing of fuel. The tank was invented by Henry Lorenz, of Bayside, N. Y.



Rake Cleans Own Teeth. You wouldn't have to stop every few minutes to clean out this rake by hand. Just press a lever on the handle, and a plate slips down along the prongs, pushing off the clogged material in an instant. Let go, and a spring bar snaps the cleaner back. The inventor is William Barracks, of College Point, N. Y.

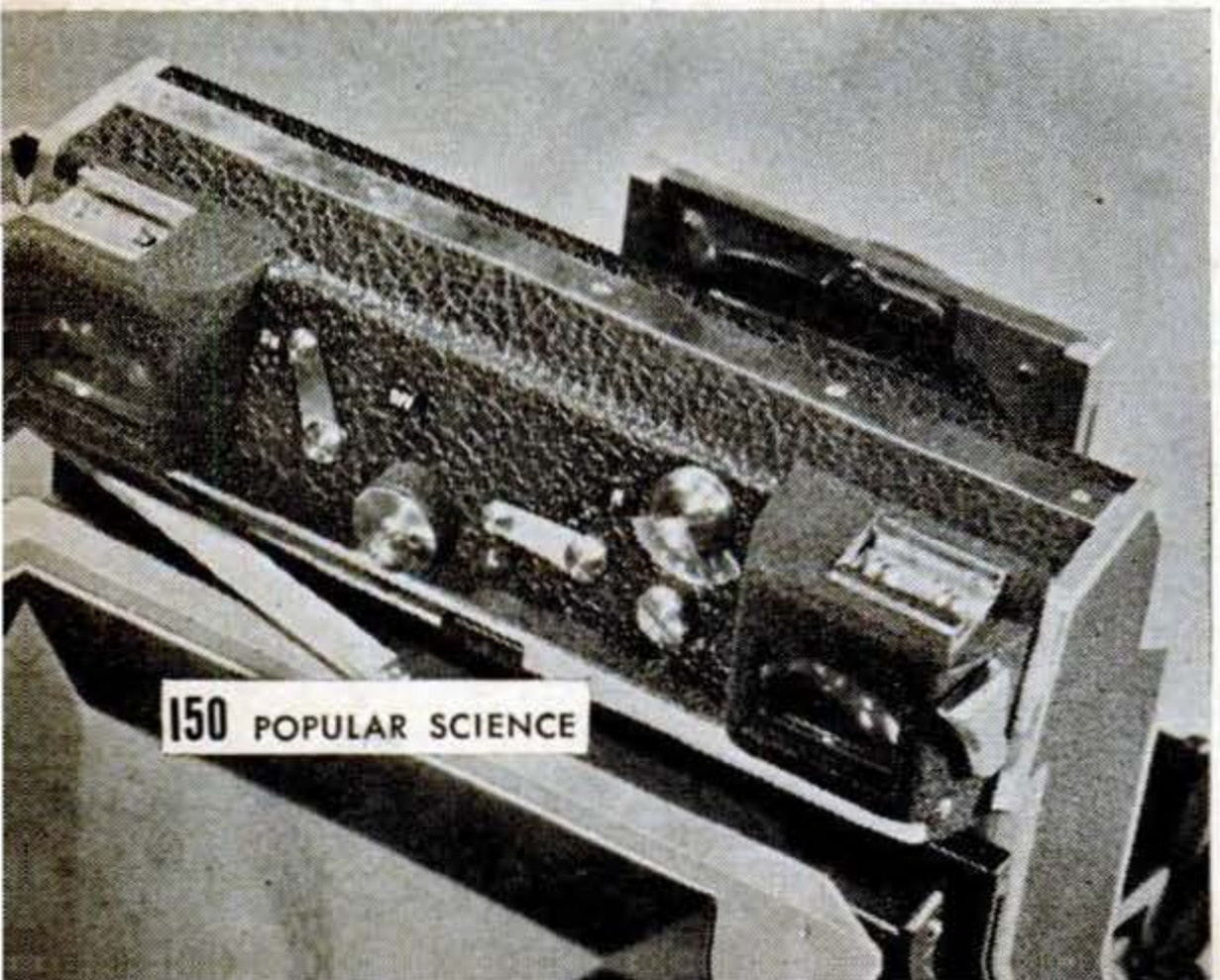


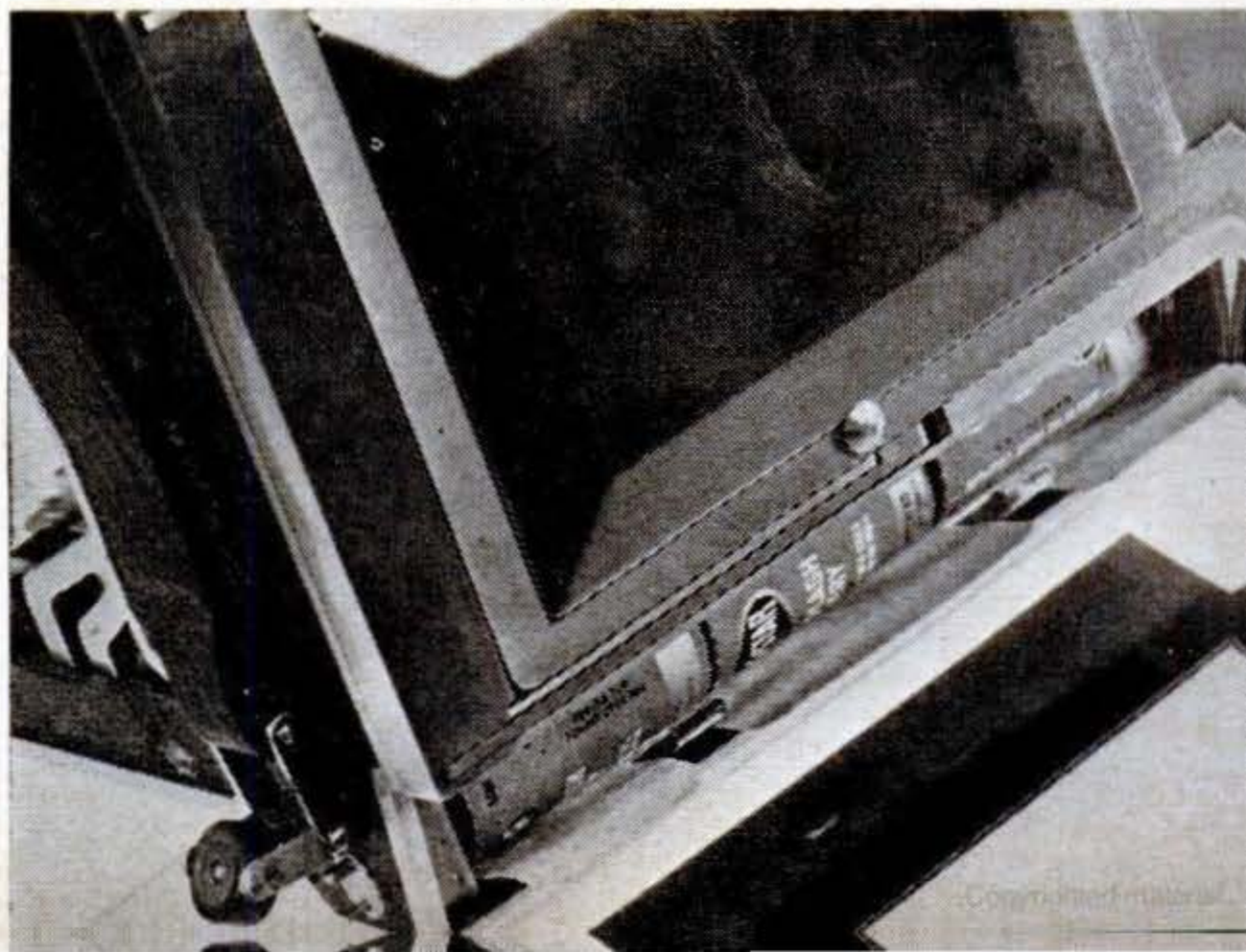
New Wheels for Old Skates. Large side wheels, supporting the ball of the foot, give these novel roller skates a low center of gravity and a pivot point for easier turning. Smaller toe and heel wheels let the skater rock his weight back and forth on the large ones without taking a header. The inventor is Arnold Vincent, of New York City.

Body of the new Kalart camera is made of lightweight, die-cast aluminum and stainless steel.

Twin range finders and view finders shown here allow use of best eye. On-off switch is for Focuspot®. The "L" and "R" switch determines which of the two windows is in use.

Standard batteries for operating Focuspot and solenoid, and for flashing bulbs are housed in recess as shown at bottom of picture below. Outlet at left is for plugging in extension flash.





This Camera Can't Go Wrong

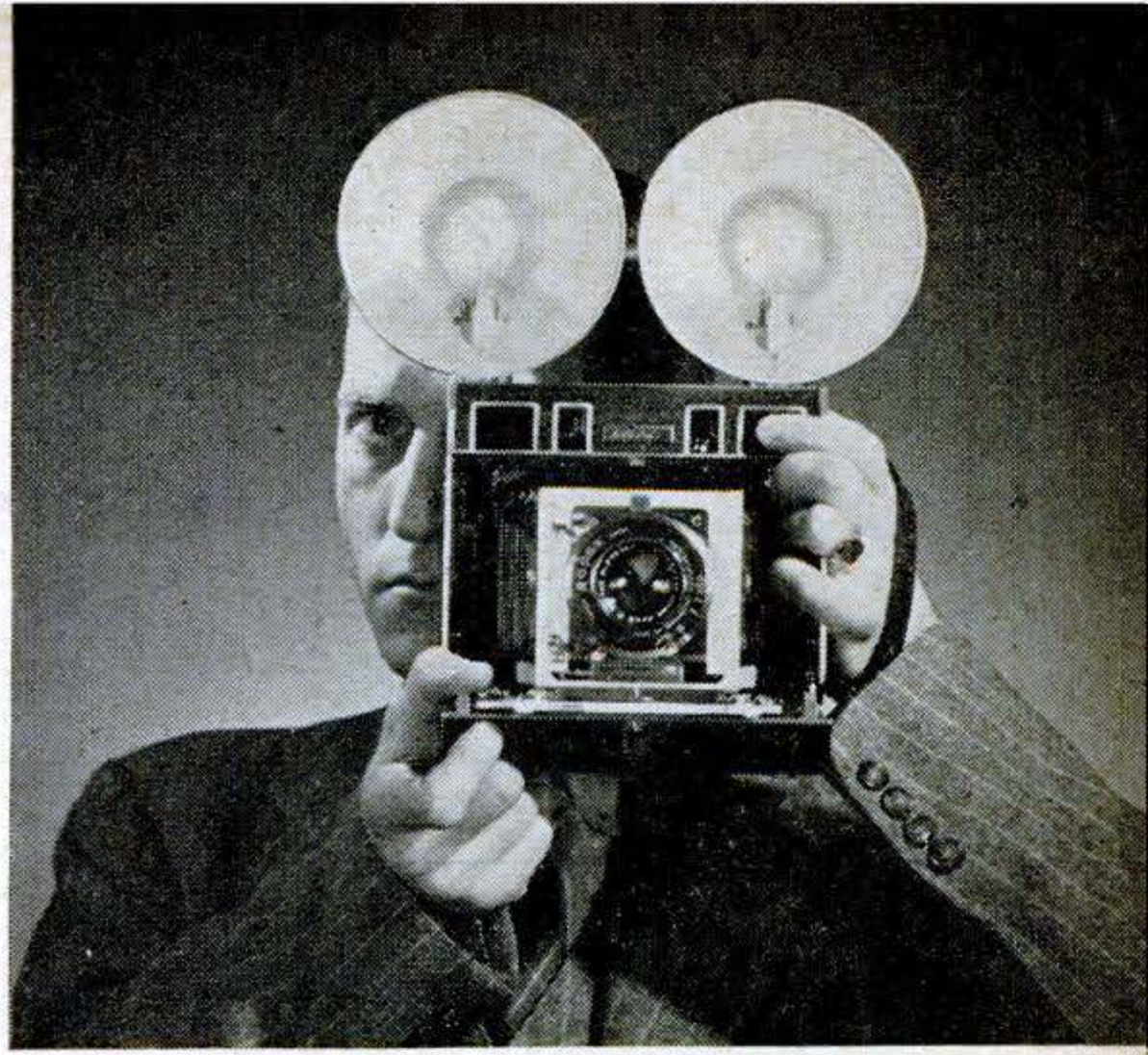
By Hubert Luckett

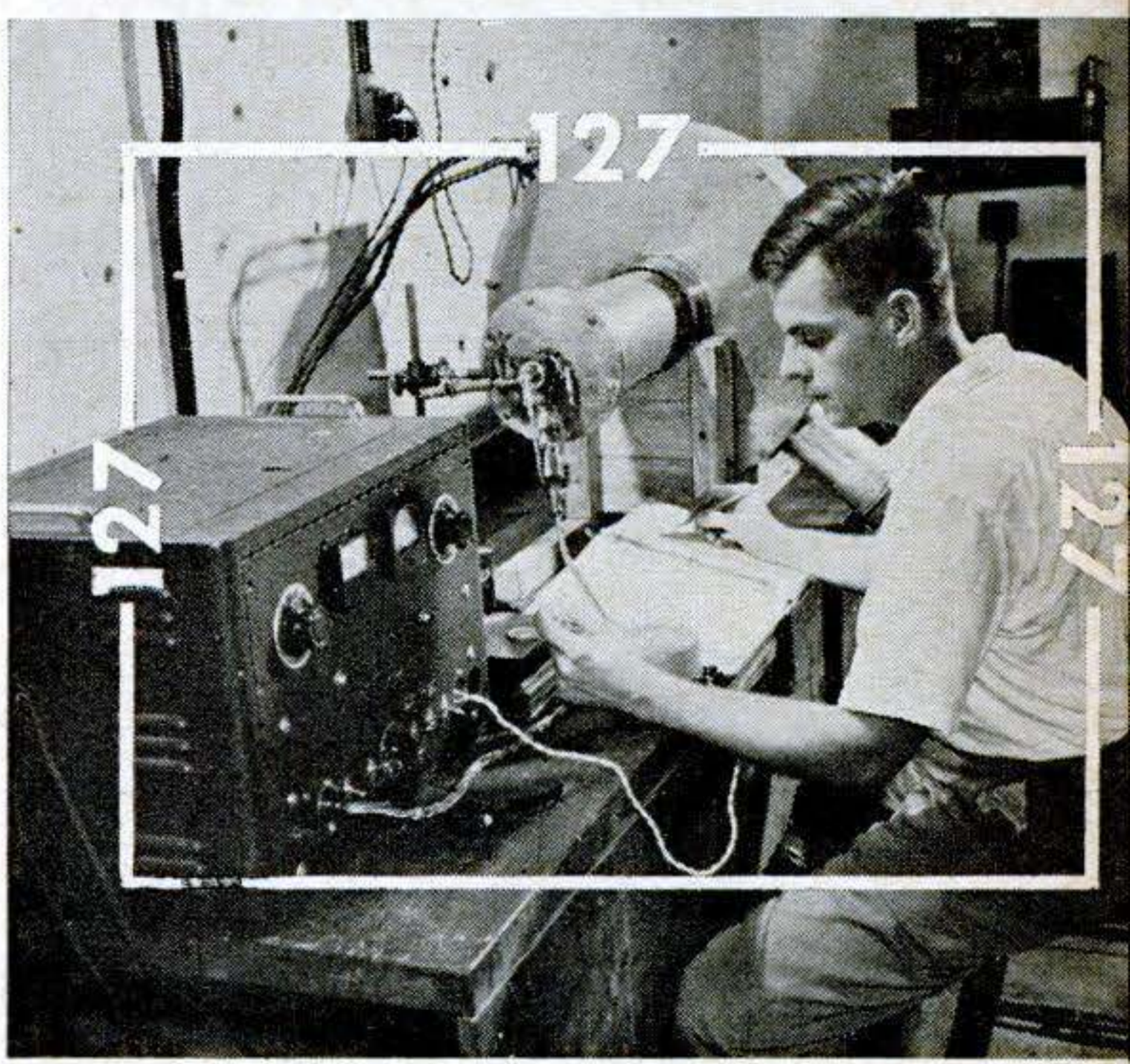
HERE'S a camera that does its best to keep you from missing that vital shot. You can't trip the new Kalart's shutter without having put in a film holder and withdrawn the slide. You can't fire a flash bulb without having cocked the shutter. You can't change the focus without knowing it.

Yet there are no accessories tacked onto this Rolls-Royce of cameras. These safety devices are built right into it. So are the range finder, view finder, synchronizer—even the batteries and all the necessary wires and links.

The lens board permits easy interchange of lenses and provides vertical rise and horizontal shifts. The solenoid shutter tripper, permanently fixed to the camera bed, serves any lens that may be used. And since most people have better vision in one eye than the other, the camera has dual range-finder and view-finder windows, as well as dual shutter releases. The range finder permits extremely close focusing and also has a Focuspot Ⓣ for correct focusing in poor light. The camera takes 3¼-by-4¼ film, in either standard film holder or a film-pack adapter.

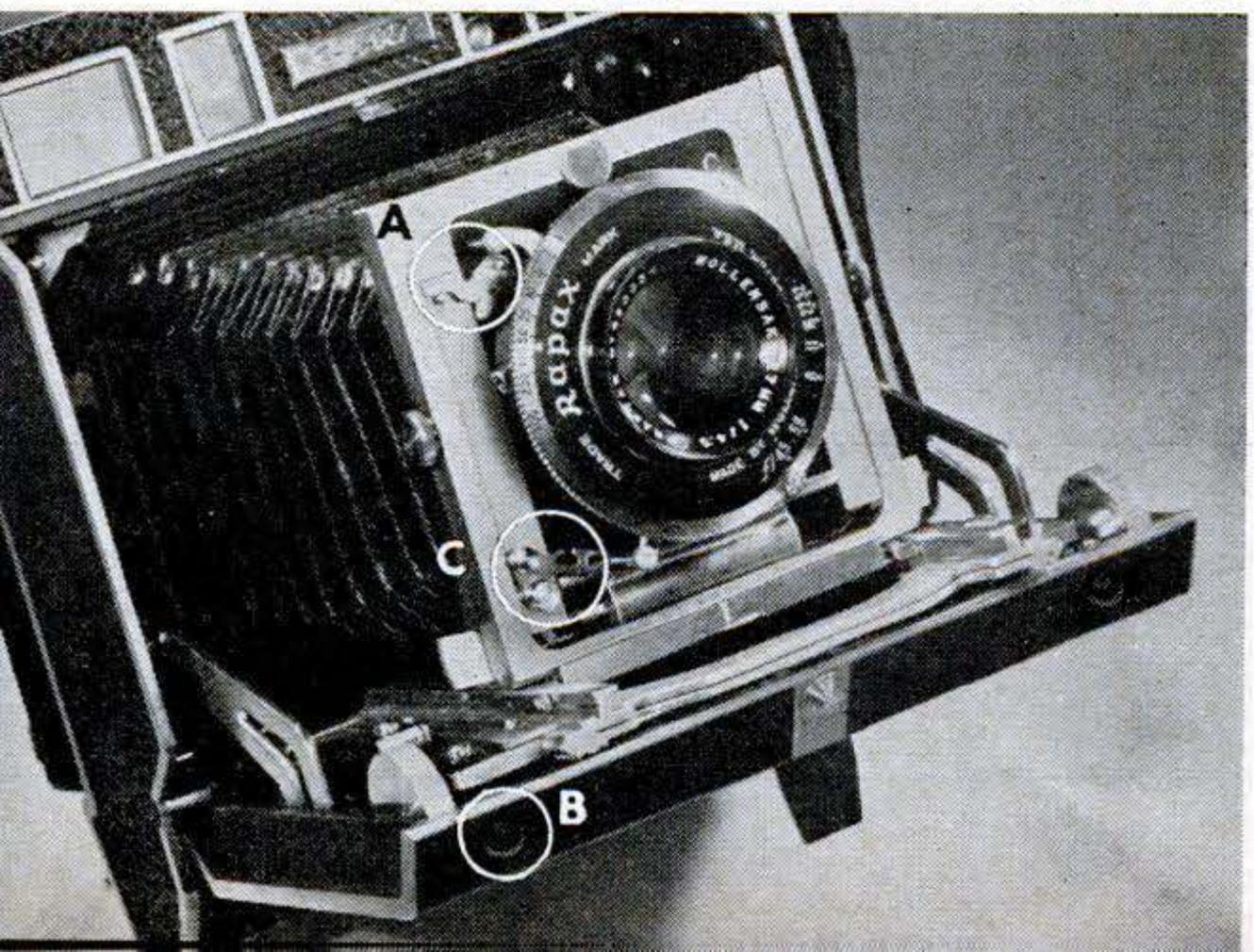
It will sell for about $400. You'll probably be able to get one late this year.



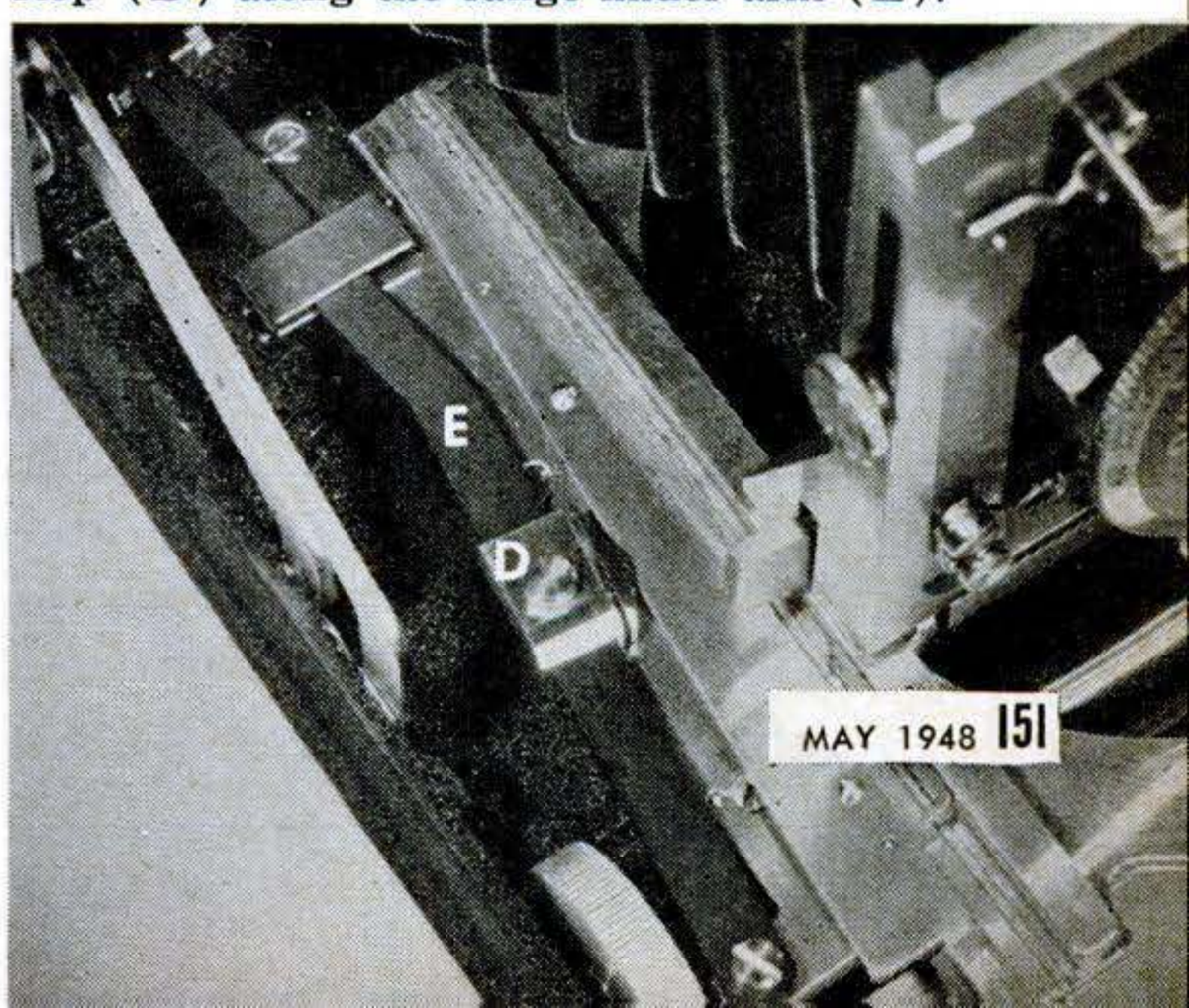


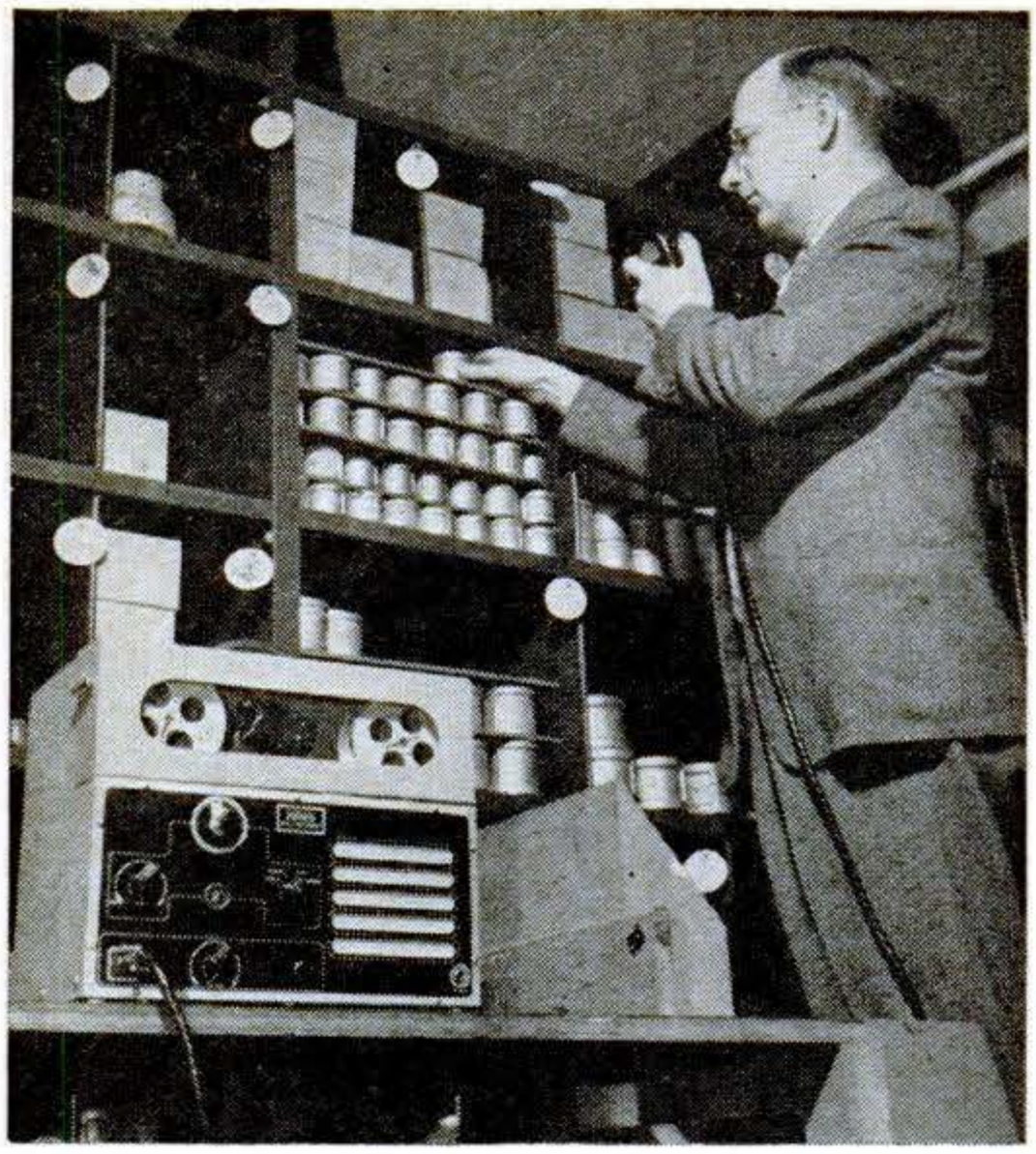
First the range finder is used with one eye closed. Then, without shifting from the window, the eye is opened (top picture) and you see the exact area that will be in the picture. Through an optical illusion this section of the actual scene, full size, will appear to be outlined by a luminous frame as shown in bottom photo.

Safety switch (A) at top left of lens board is controlled by shutter-cocking lever next to it. Other features shown are release for self-locking focusing device (B), and solenoid linkage (C).



A wedge running the full length of the camera bed operates the range-finder mechanism. It is easily adjusted for different lenses by moving stop (D) along the range-finder arm (E).



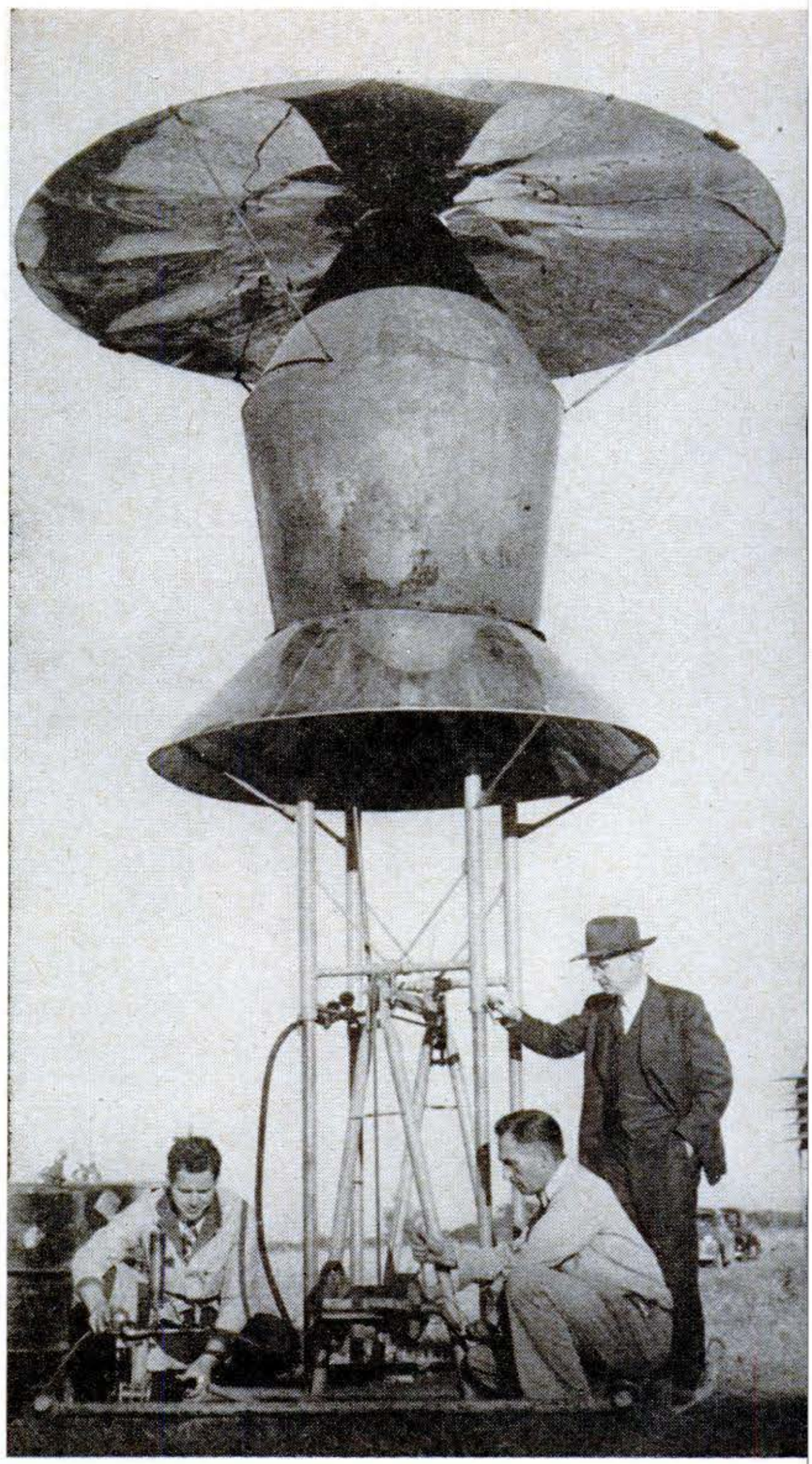


Inventory Speeded Up

THE man with the microphone is taking inventory the modern way. As he checks stock at the Naval Shipyard, Norfolk, Va., he calls off the items. These are registered on the magnetic wire recorder shown at lower left, and later transcribed on a master sheet. During a speed test using the new system, 100 items were counted in 15 minutes, as compared with 400 items a day for the old two-man-team inventory method.

Locos Get More Light

THE twin "eyes" bugging out from the front of this Iron Horse are new and more powerful locomotive Sealed Beam Ⓣ headlights developed by General Electric. Two 200-watt, 30-volt lamps, throwing a beam of 400,000 candlepower, replace the old-type single 250-watt lamp. In case one lamp fails, the other still gives ample light.



Furnace Fights Frost

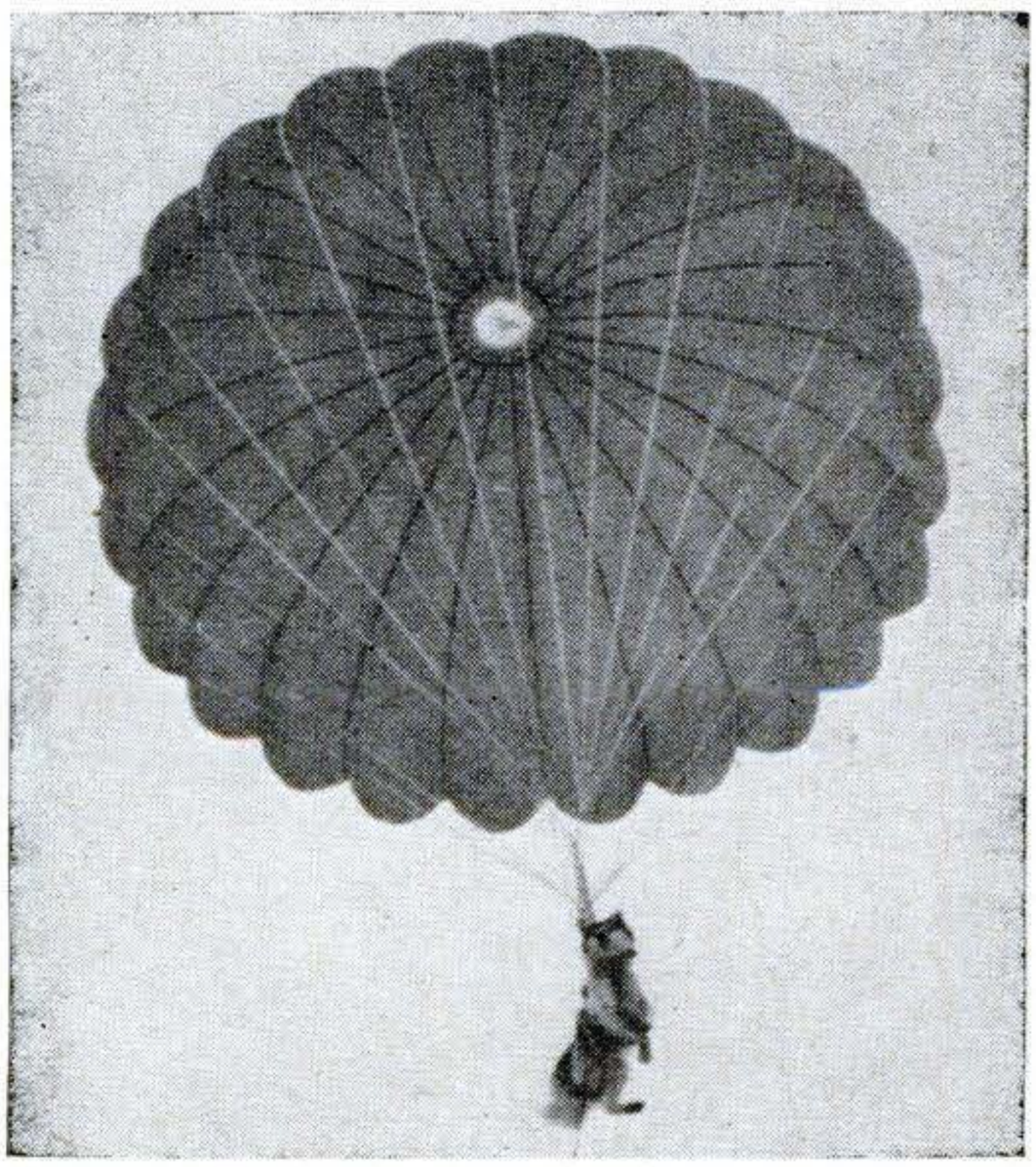
THIS pagodalike projector will protect crops from moderate frost within a radius of more than 100 feet. The structure houses a unit that burns oil under high pressure to throw off invisible infrared rays. During one experiment, the machine radiated more than three-quarters of a million B.T.U. of heat an hour. It held plant temperatures inside the test area at 37° F., although outside temperatures dropped to 29°.

Developed by Michigan State College engineers, the "Frost Fighter" Ⓣ will soon be made available to farmers for protection of high-value crops. It will be manufactured by the Evans Products Co., of Detroit.

Copyrighted material

Tossed out to clear plane's stabilizer, a husky starts down. Static line trips back-pack 'chute.

Huskies Hit the Silk



Paradogs seem to enjoy the drop. Once down, they know enough to jump on 'chutes to keep ground winds from pulling them about. 'Chute harness becomes a sled harness on the ground.

FOR rescue expeditions in the Arctic, where every mile is an ordeal, the Air Transport Command has combined the old and the new—dog sleds and airplanes. Dropping a dog team by parachute, along with a sled, dog handler, and doctor, brings quick aid to crash survivors who might otherwise have a long and painful—possibly fatal—wait. These pictures of airborne huskies were taken during a Labrador demonstration.

Doctor and dog handler hitch up team after the drop. Sled carries crash victims to nearest cleared area, where ski-equipped plane can pick them up for a quick flight to a hospital.

Copyrighted material

Dr. Percy W. Bridgman, Hollis Professor of Mathematics and Natural Philosophy at Harvard, has produced the mightiest squeeze in the world.

The Man Biggest

Bridgman's high-pressure machines strengthen guns, may one

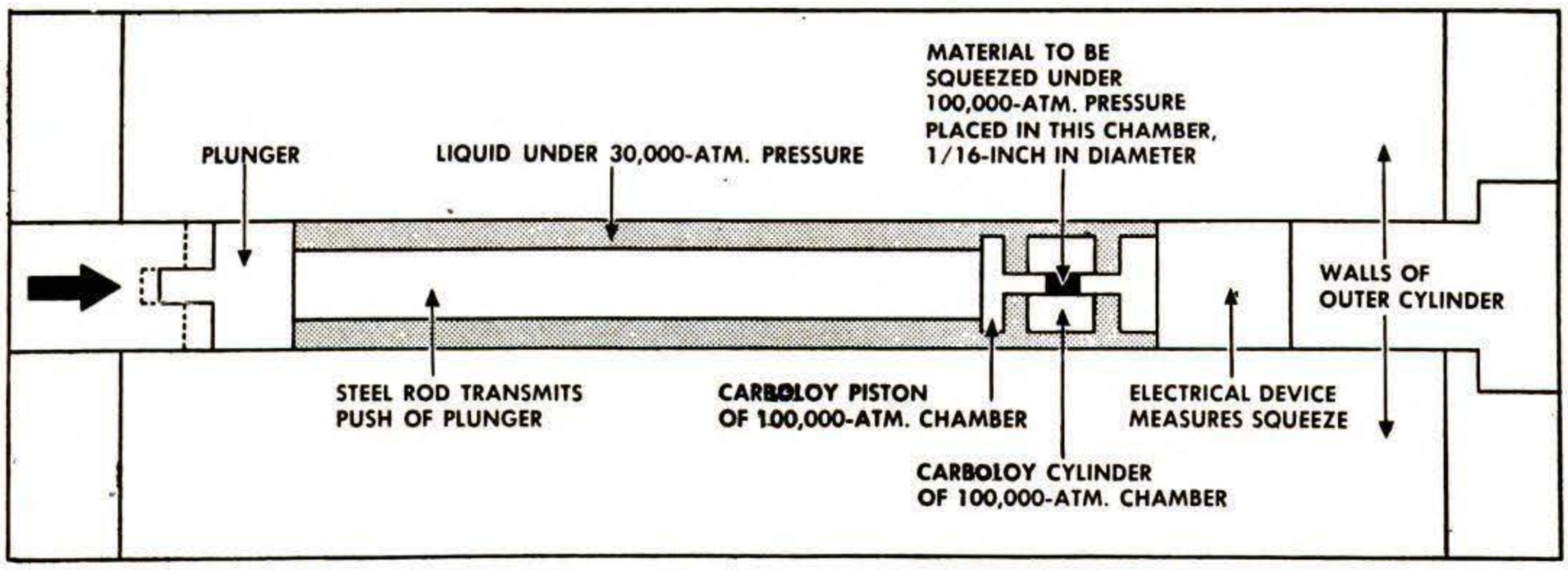
By Herbert Yahraes

IN THIS high-pressure world, the man who puts on the biggest squeeze is mild, elderly Professor Percy Williams Bridgman, of Harvard. He bears down with pressures that create hot ice, glassy oil, ductile steel, and plastic rocks, and that, in at least one element, crack the atom.

His pressures are so great that they are measured not in the usual engineering terms of pounds per square inch but in atmospheres. One atmosphere is a little less than 15 pounds per square inch, the pressure of the earth's atmosphere at sea level. Gasoline is cracked at several hundred atmospheres; the pressure at the bottom of the deepest sea is 1,000 atmospheres; and the explosive force inside of a big gun is 3,000 atmospheres.

But Bridgman habitually works with pressures up to 100,000 atmospheres—equal to a 750-ton flatiron squeezing an area as big as the end of your thumb. Recently he has reached the unprecedented pressure of 425,000 atmospheres. This is more than one-tenth the pressure at the center of the earth, where geologists believe that even molten iron may turn solid. Experiments leading up to it indicate that some day Bridgman, or some other high-pressure physicist, is going to make an especially precious find—how to synthesize diamonds.

As a pure scientist—and a Nobel prize-winning one—Bridgman ventures into dark territory, not knowing what he will find, and not caring whether his findings will be im-



This machine inside a machine has achieved a pressure of 100,000 atmospheres. Liquid in outer cylinder is first raised to 30,000-atm. pressure by pushing in plunger at left. In turn, pressure of liquid helps keep walls of inner cylinder from bulging as plunger continues, pushing in pistons of inner cylinder to produce 100,000-atm. pressure in the tiny innermost chamber.

Copyrighted material

with the Squeeze

have already shown how to day teach us to make diamonds.

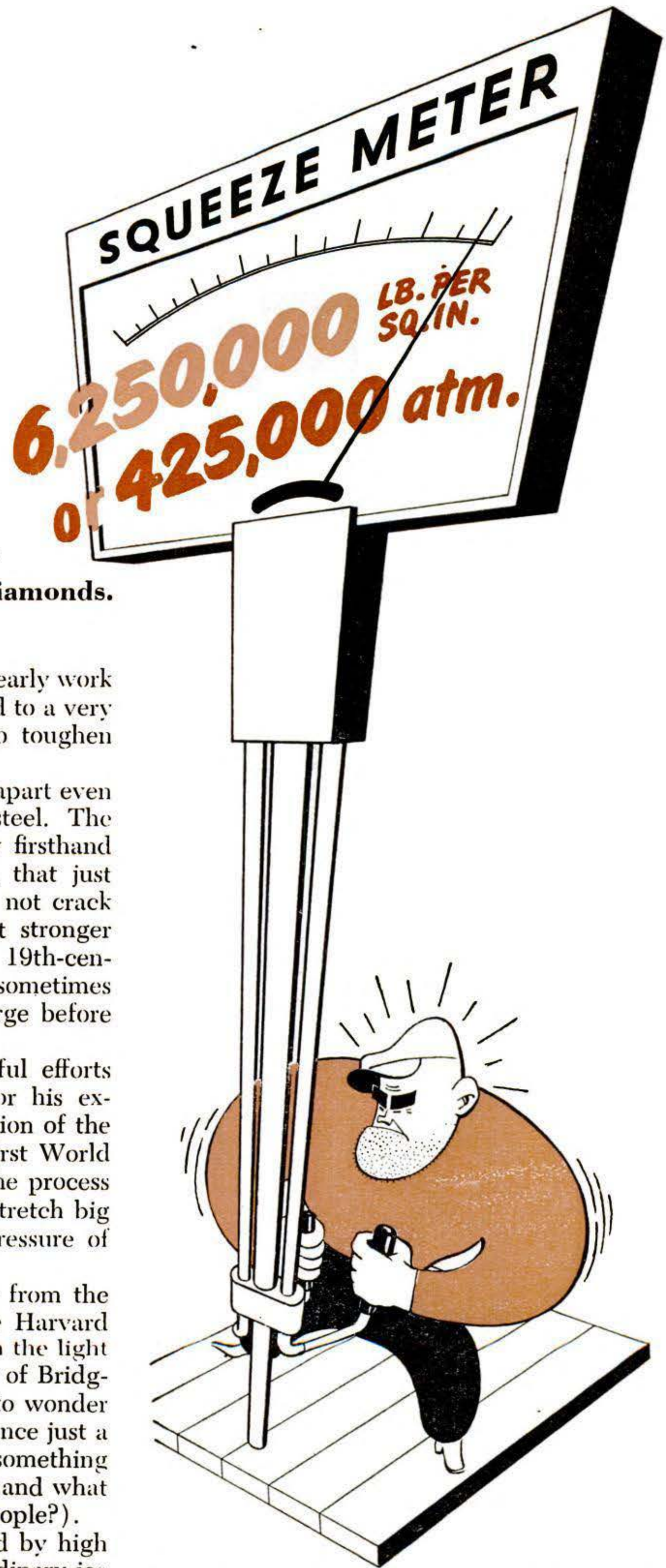
mediately useful. But Bridgman's early work with high pressures has already led to a very practical by-product—a method to toughen the barrels of big guns.

Terrific inside pressure will rip apart even a cylinder made of the toughest steel. The Harvard physicist learned that by firsthand experience. But he learned, too, that just the right amount of pressure will not crack but stretch the steel and make it stronger than ever. The idea wasn't new: 19th-century gun-makers had applied it—sometimes disastrously—by firing a huge charge before finishing the barrel.

But it was Bridgman's successful efforts to get nonrupturable cylinders for his experiments that attracted the attention of the Army and the Navy during the first World War. And now autofrettage, as the process is called, is used fairly widely to stretch big guns up to five percent with a pressure of from 6,000 to 7,000 atmospheres.

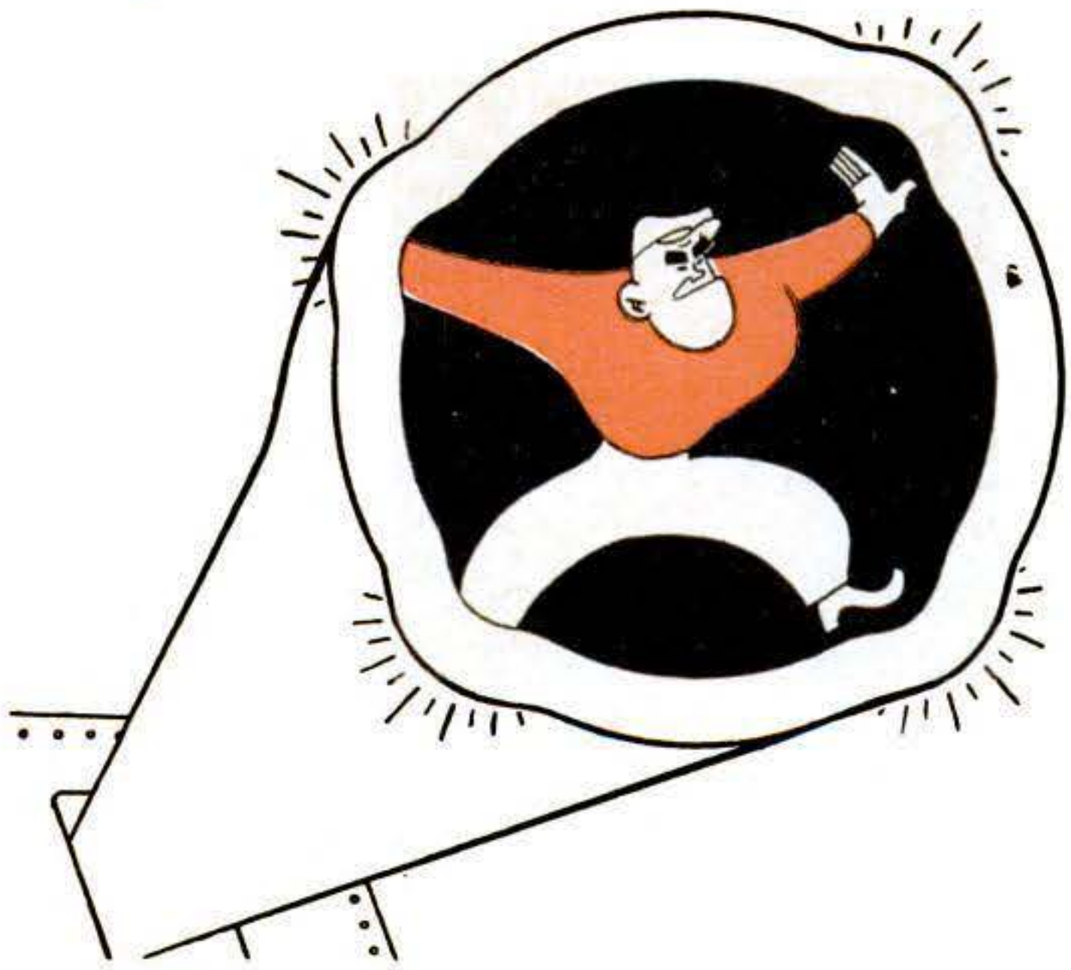
What practical results will flow from the newer and bigger squeezes in the Harvard laboratories remains to be seen. In the light of what we know at present, many of Bridgman's findings are just something to wonder at—as Volta's electric battery was once just a curiosity, and nuclear fission just something that told us more about the atom (and what had atoms to do with ordinary people?).

Among the curiosities uncovered by high pressures are new kinds of ice. Ordinary ice is a curiosity in itself—lighter, unlike other frozen fluids, than the liquid it came from. But under a pressure of 2,000 atmospheres,



High Pressure Pete. imaginary inhabitant of Dr. Bridgman's high-pressure machine, has a 425,000-atm. squeeze. One atmosphere equals air pressure at sea level—about 14.7 lb. per sq. in.

Copyrighted material



High Pressure Pete pushes out the barrel of a big gun from within. In a process called autofrettage, high pressures toughen the gun's steel barrel by stretching it up to five percent.

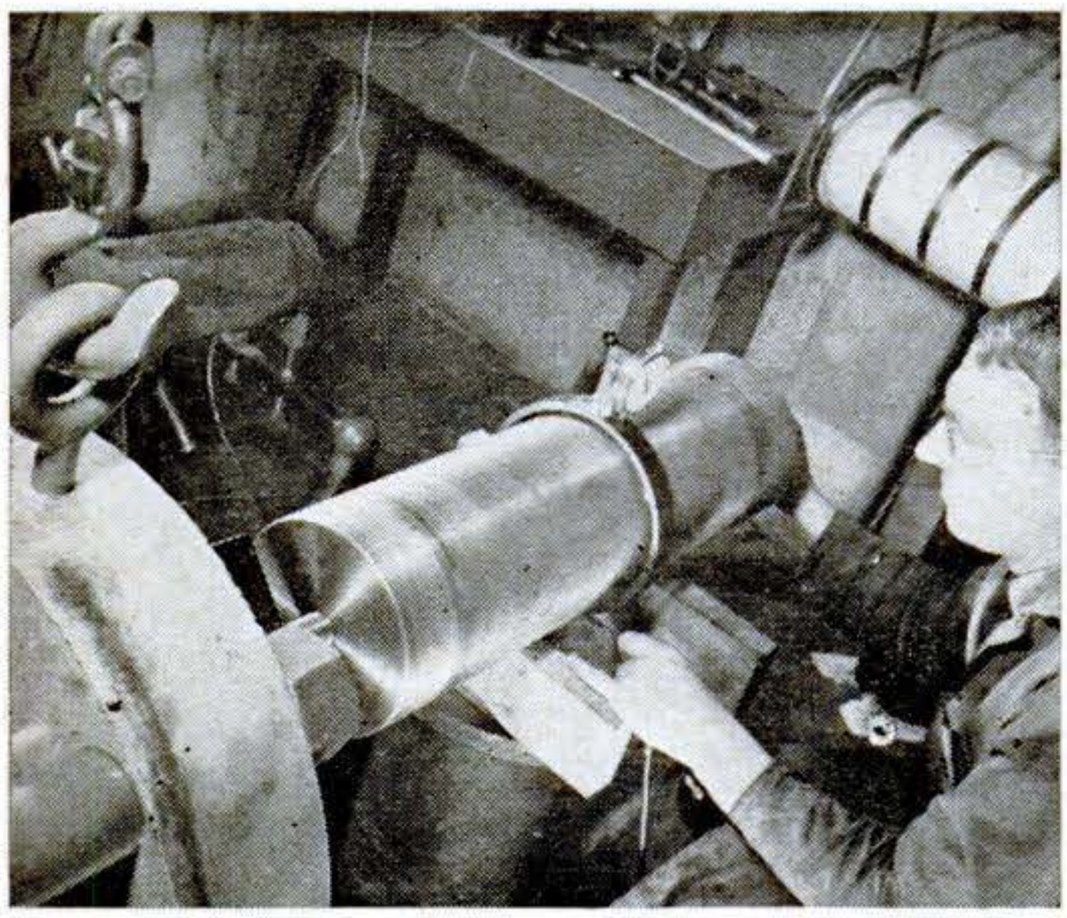
Even an atom has cracked when High Pressure Pete jumped on it. The element caesium collapsed when put under 50,000 atmospheres —one of its electrons had been forced to move.

this ice is transformed into a variety that is *denser* than water. At 3,500 atmospheres this breaks down into still another kind of ice, and at 6,400 this variety gives way to still another. Altogether, six new kinds of ice have been found by high-pressure physicists, and the 40,000-atmosphere one melts only at the temperature of melting solder.

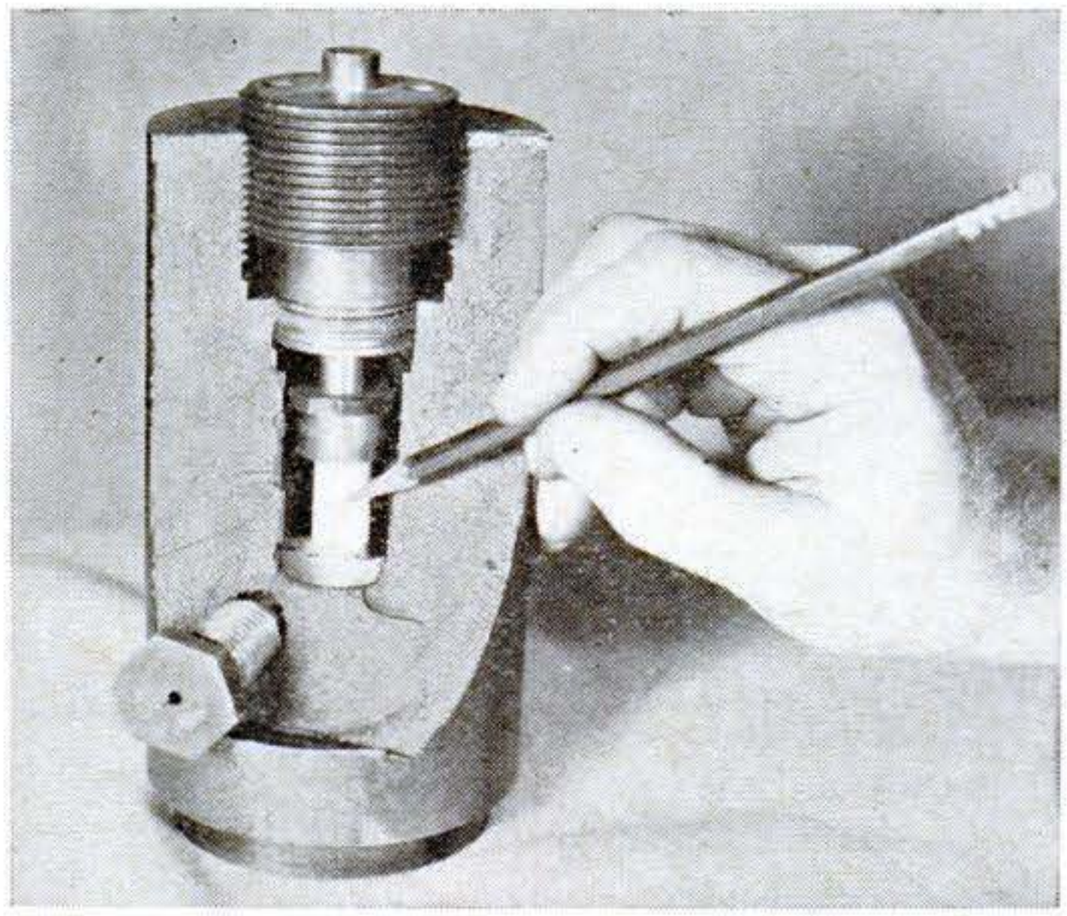
Some materials become brittle under pressure; others become ductile or even viscous —stirry. Machine oil, for instance, gets glassy. Phosphor bronze, as brittle as glass under ordinary conditions, becomes ductile under high pressure. And tiny sapphire rods, used as nozzles for rayon-spinning machinery because they are a good deal harder than steel, lose their brittleness under pressure and can be bent.

On the other hand, graphite flows, like molasses. Why bother with graphite? Well, for one thing, graphite is native carbon and so is a diamond. In her own high-pressure laboratory, Nature has transformed something soft and black and cheap into something almightily hard and precious. Maybe man can, too.

Bridgman at various times has tried to find out. Theoretically the change ought to occur somewhere around 30,000 atmospheres, but one of the problems here, as in other high-pressure experiments, is the smallness of the working space. The higher the pres-

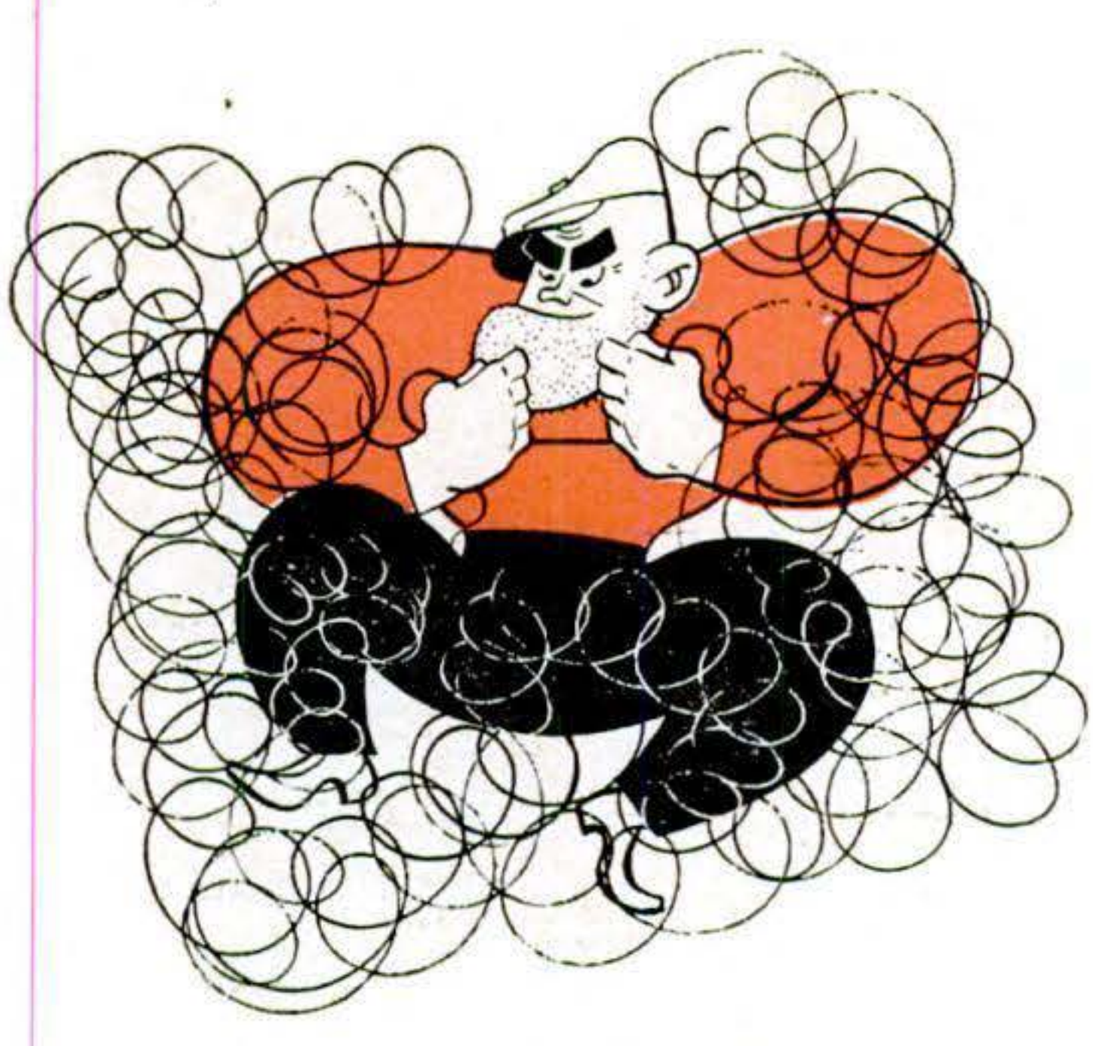


This cylinder, similar to those used in high-pressure apparatus, has been strengthened by internal high pressures. Now Dr. Francis Birch of Harvard measures how much it has stretched.



This heavy steel cylinder has been broken apart by the tremendous internal pressures developed by Bridgman's apparatus. Pencil points to where test material was subjected to squeeze.

Copyrighted material



High Pressure Pete can pull steel wire out to 300 times its original length by putting it under a pressure of 25,000 atm. The wire becomes stronger than when treated by any other method.

Ice can be made—when Pete puts it under a 40,000-atm. squeeze—that will turn to water only at the temperature of melting solder. This ice is heavier instead of lighter than water.

sure, the smaller the apparatus, primarily because only small pieces of steel can be hardened all the way through, and if they aren't hardened all the way through, they burst. Expense and time also figure in: there's a limit to what one man and a few assistants, working on a university budget, can do.

Bridgman's first work at the theoretical graphite-into-diamond pressure was done in a vessel only a quarter-inch in diameter. A few years ago, however, three commercial companies—General Electric, Carborundum, and Norton—financed a study that enabled him to build apparatus for attaining 30,000-atm. pressure in a much larger space—two inches wide and several inches long—and to apply great heat at the same time.

No diamonds. But the physicist did prove beyond all doubt the essential sameness of the two substances. For, though graphite did not turn into a diamond under the particular conditions he was working with, a diamond did turn into graphite. Furthermore, the results hinted that with the right pressure and heat, diamond synthesis was possible.

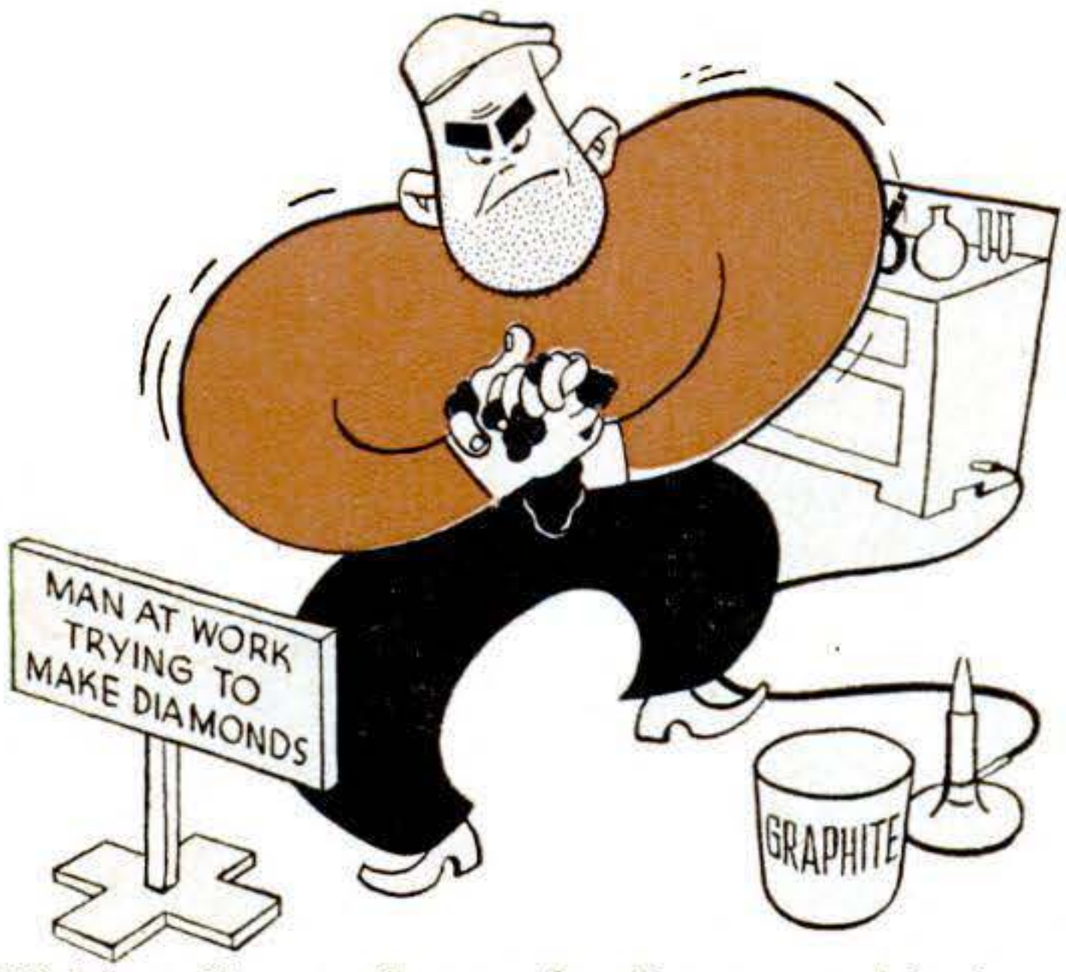
Bridgman is as curious about what happens to ordinary rock under pressure as he is about what happens to ordinary graphite. And the pressure changes in rocks promise to be of commercial as well as scientific interest. For pressure squeezes out their porosity, and it's the porosity that affects the speed of the elastic waves the seismograph picks up. Geologists can't see what lies deep beneath the surface, but Professor Francis Birch and others using Bridgman's methods can duplicate the pressure and heat conditions that exist there. In this way they are piling up facts about the changes in minerals under those conditions—facts that one day may prove invaluable to the prospector using seismologic techniques.

Almost everything put into Bridgman's pressure chambers undergoes polymorphic transition—changes in crystal structure that do not affect the chemical composition. Camphor, for instance, under pressure exists in 11 different forms. With the exception of diamond-into-graphite, however, only two nonreversible processes have been found so far. At 40,000 atmospheres, and 175 degrees Centigrade, carbon bisulfide, an evil-smelling liquid used as a solvent, becomes a black solid and stays that way. And at 12,000 atmospheres and 200 degrees, yellow phosphorus becomes black and, unlike the yellow, conducts electricity.

For the present there is nothing to do with Bridgman's mass of material on these polymorphic changes except, as he puts it, to store them "like a collection in a museum, waiting for the later moment of illumination."

When Bridgman began his work in 1905, the highest pressure anyone had reached was 3,000 atmospheres. It was applied by an hydraulic press, operating through a piston, on material inside a steel cylinder, and the limit was set by leakage of the pressure medium. Bridgman stopped the leakage by devising a method whereby the pressure on the rubber packing in the cylinder head was always

Copyrighted material



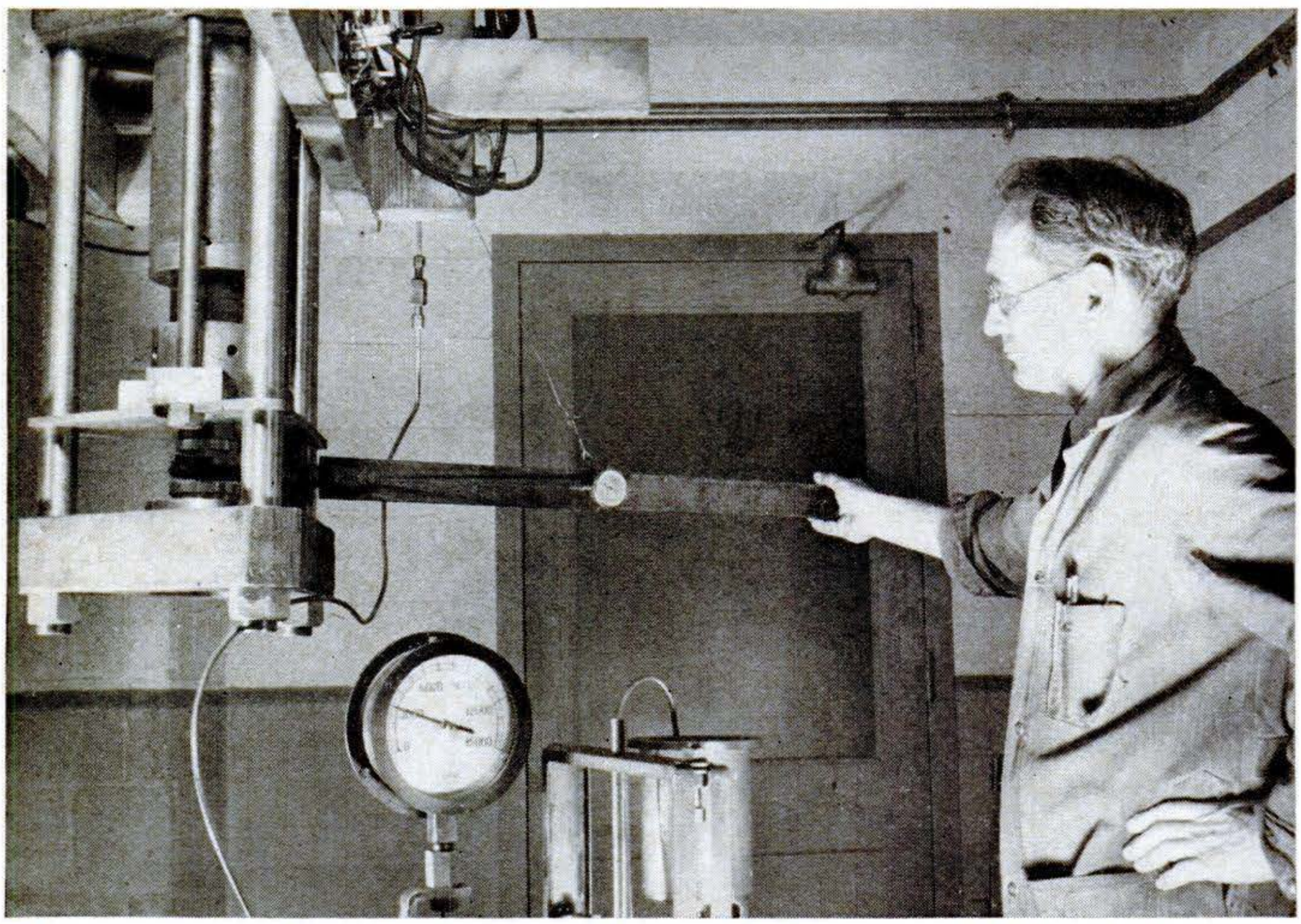
Making diamonds out of ordinary graphite is a job High Pressure Pete may be able to pull off some day. To do it, though, he will have to match nature's great heat and high pressure.

greater than that on the material under study: the higher the pressure, the tighter the vessel became.

Now the limit was set by the strength of the cylinder. At various points above 3,000 atmospheres, steel vessels would rupture even though they were four or five inches thick and the pressure chamber inside only half an inch wide. Sometimes the break would come with explosive force; once a hunk of steel shot off and sailed through a window 15 feet away. Bridgman says with a straight face that his efforts to learn how far he could safely apply pressure were "not without danger"; actually, he is lucky to have come through alive. Nowadays he has steel plates half an inch thick shielding all dangerous apparatus.

Using the best heat-treated alloy steels, the physicist eventually reached a workaday pressure of 12,000 atmospheres. Above that, his vessels kept bursting: to go higher he needed to give them greater external support. He solved the problem by building a vessel with a conical shape and then, as pressure was built up inside, driving the whole vessel into a conical seat, as a stopper is pressed into the neck of a bottle.

This method worked fine, up to a point. But at 50,000 atmospheres the big push inside was so great that the apparatus showed signs of going to pieces in all directions, like the deacon's one-hoss shay. Again the prob-



This apparatus, combining shearing stress with hydrostatic pressure, is used for exploratory measurements at extremely high pressures. A pressure of 50,000 atmospheres is concentrated on ¼-in. boss near end of lever in hanging apparatus at left. Dr. Bridgman, at right, is looking at a gauge that reports the amount of shearing force applied by pulling the lever.

Copyrighted material

lem was to get more support for the pressure vessel. Bridgman met it this time by building a nest of machines—one tiny one inside another.

In the outer apparatus, of steel, a pressure of 30,000 atmospheres is reached by compressing a liquid like pentane. This pressure keeps the apparatus inside from flying apart. The inner machine is a steel-jacketed Carboloy Ⓣ cylinder. Through the Carboloy, an extremely hard material that can be cut only by diamonds, a hole one-sixteenth inch in diameter has been bored. The material to be examined is placed in this hole, and two tiny Carboloy pistons are pushed together upon it. Their thrust, which reaches 100,000 atmospheres, is measured by an electrical device immersed in the fluid.

The same principle of a squeeze within a squeeze makes possible the extreme pressure of 425,000 atmospheres. But in this case, instead of a cylinder and pistons, Bridgman uses two Carboloy blocks, and the material to be examined—a mere flake—is placed between them. Tiny though the sample is, it can be examined afterward by X ray to see if there has been any permanent change.

Still higher pressures are possible, but they will require two stages of support—a machine inside a machine inside a machine—and right now Bridgman feels he has plenty of work cut out for him at lower ranges.

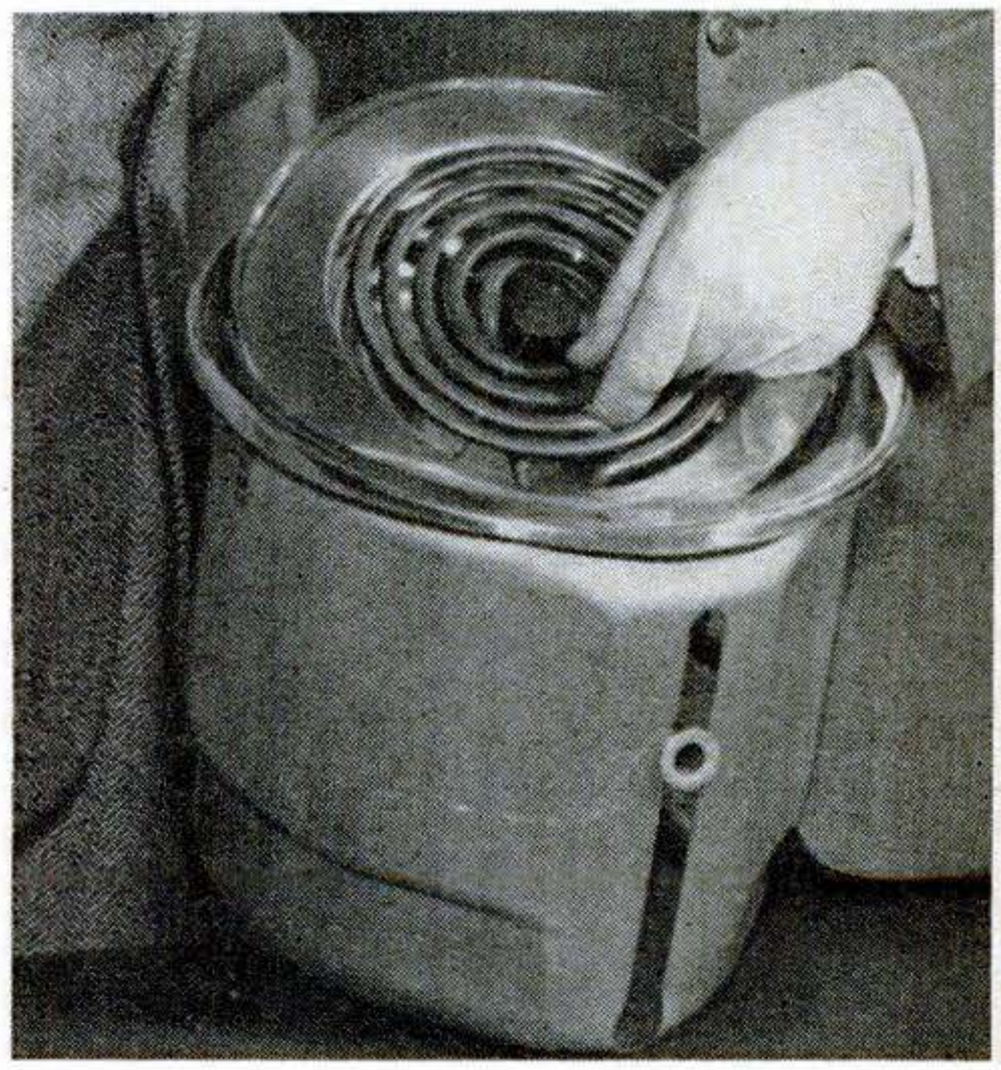
Others Use High Pressures

Other scientists are following his trail. Geophysicists at the Carnegie Institution recently made talc and some other minerals in a tiny high-pressure chamber that duplicated conditions several miles down in the earth. The Bureau of Mines and the Army are using Bridgman apparatus to test explosives. And the Bureau of Standards is installing a 10,000-atmosphere machine for studies expected to standardize the measurement of high pressures.

Bridgman's latest feat is atom-smashing—not by bombardment but by squeezing. Recently he put a sample of the element caesium, a white metal of butterlike consistency, into his high-pressure apparatus. At 50,000 atmospheres, when the limit in tissue changes had been reached and no further shrinkage could be expected, it suddenly collapsed. Something had happened to the caesium atom—one of the electrons had been forced out of position. Practical significance? Bridgman shrugs. What have atoms to do with ordinary people? END

Lenses Cut Faster

THE new automatic optical machine shown above shapes eyeglass lenses in half the time needed for hand grinding. A diamond tool set in a swinging head makes both spherical and cylindrical curves in one operation in less than a minute. It is made by American Optical Co.



Double-Duty Cooker

FOR quick frying or cooking, the new Hotpoint unit shown above is raised to the top of its receptacle, giving your electric range an additional surface burner. To simmer stews or soups, the unit is lowered to the bottom, so that you have a deep-well cooker as well.

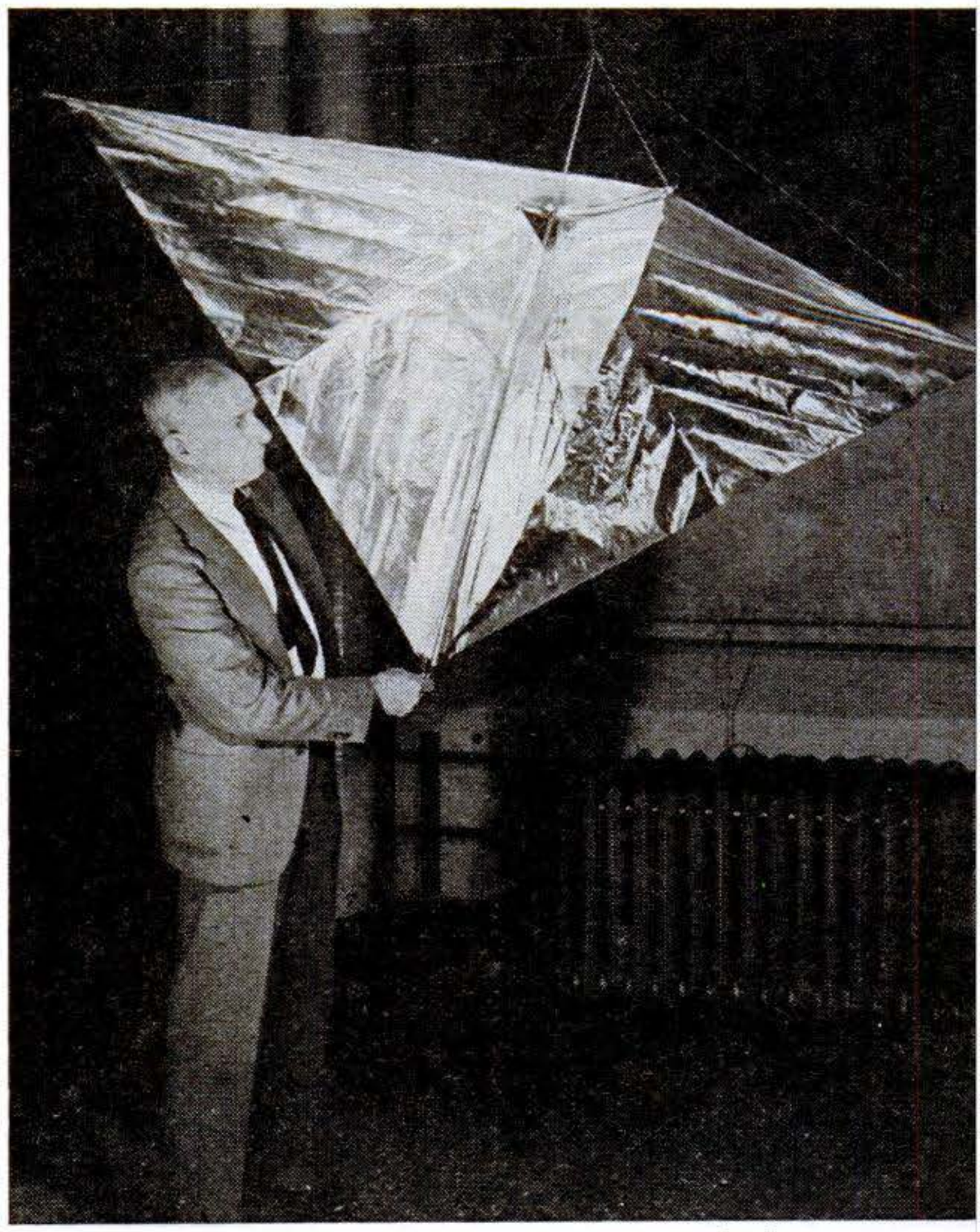
Copyrighted material

Electric blanket, one of Kearsley's best-known inventions, keeps him warm on cool nights. Having set automatic temperature control, on bedside table, he relaxes in solid comfort to finish a PS article before he calls it a day.

Retired Inventor Makes Home a Gadgeteer's Dream

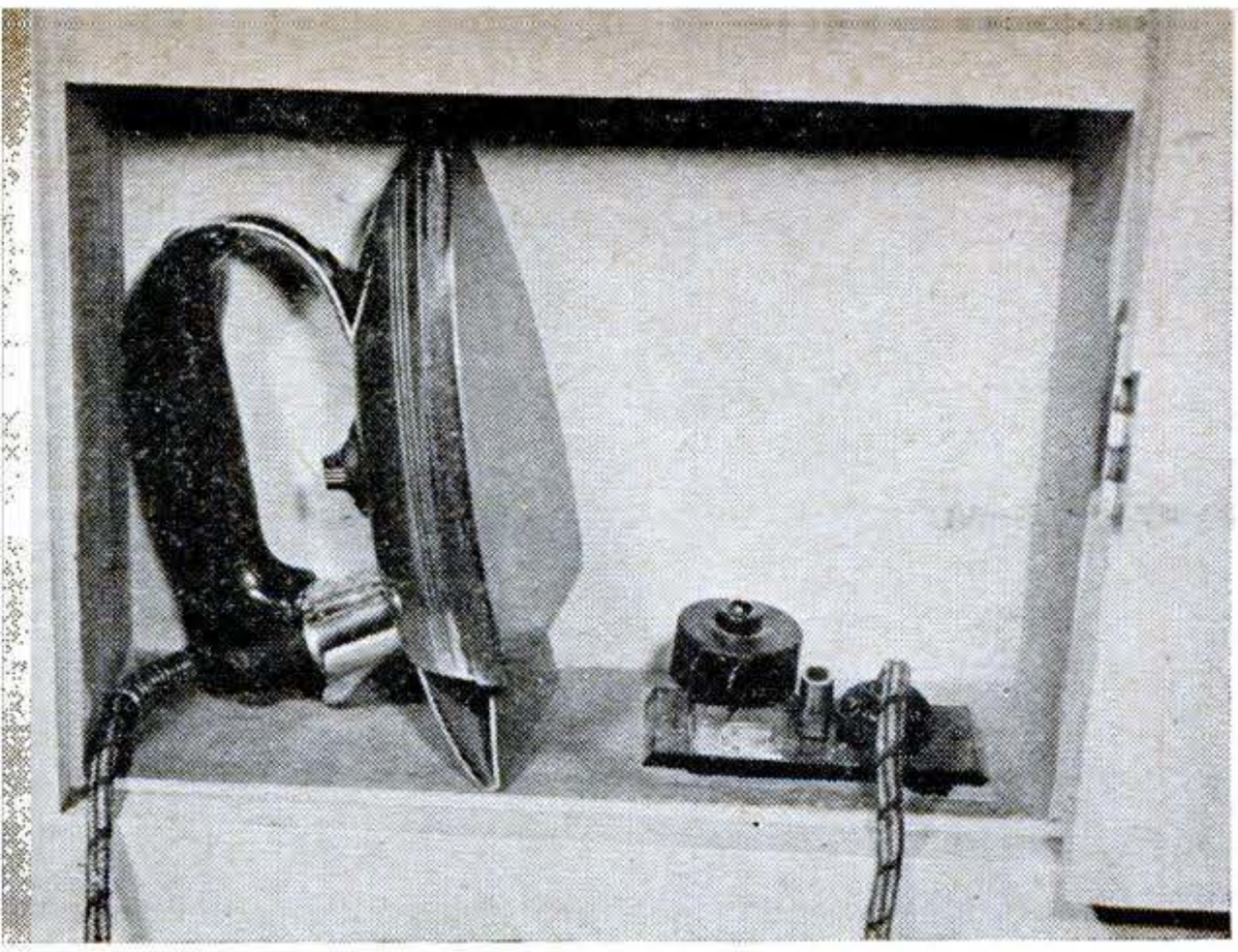
INVENTING is a lifelong habit with William K. Kearsley, retired General Electric Research Laboratory engineer. The man responsible, during his 44 years with GE, for the electric blanket and many another well-known product, now applies his ingenuity to devising conveniences for Mrs. Kearsley and himself in their Schenectady, N. Y., home. Demise of a cat shelved one of his most original ideas, but the others shown on these pages serve him well.

Sorting cats was the object of this Kearsley invention, assembled from laboratory odds and ends, at one of his cellar windows. It would admit Mickey, his black pussy, but photo cell would bar unwanted visitors by slamming a weighted door in face of cats of wrong color. Trials were pending when a truck—which did not discriminate among cats by their color—ended Mickey's career and the project.

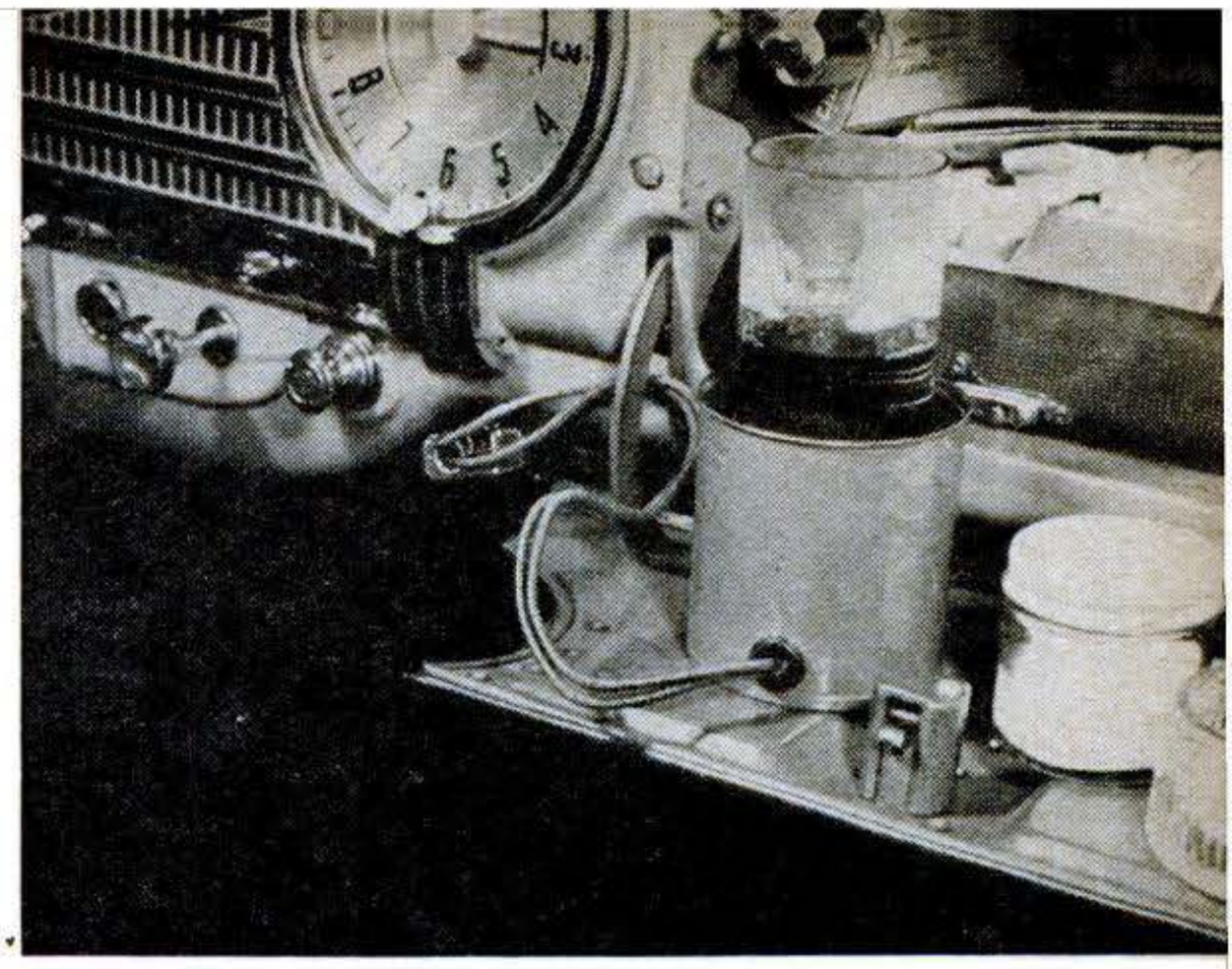


Aluminum-foil "Angel" for war use, which Kearsley exhibits in illustration above, was one of his many professional inventions. It was designed to deceive enemy radar operators by giving a radar "echo" simulating a large bomber as it floated to earth, like a parachute, after being tossed from a plane. For an aerial feint, a modest force of aircraft dropping "Angels" could masquerade as a mighty bombing fleet.

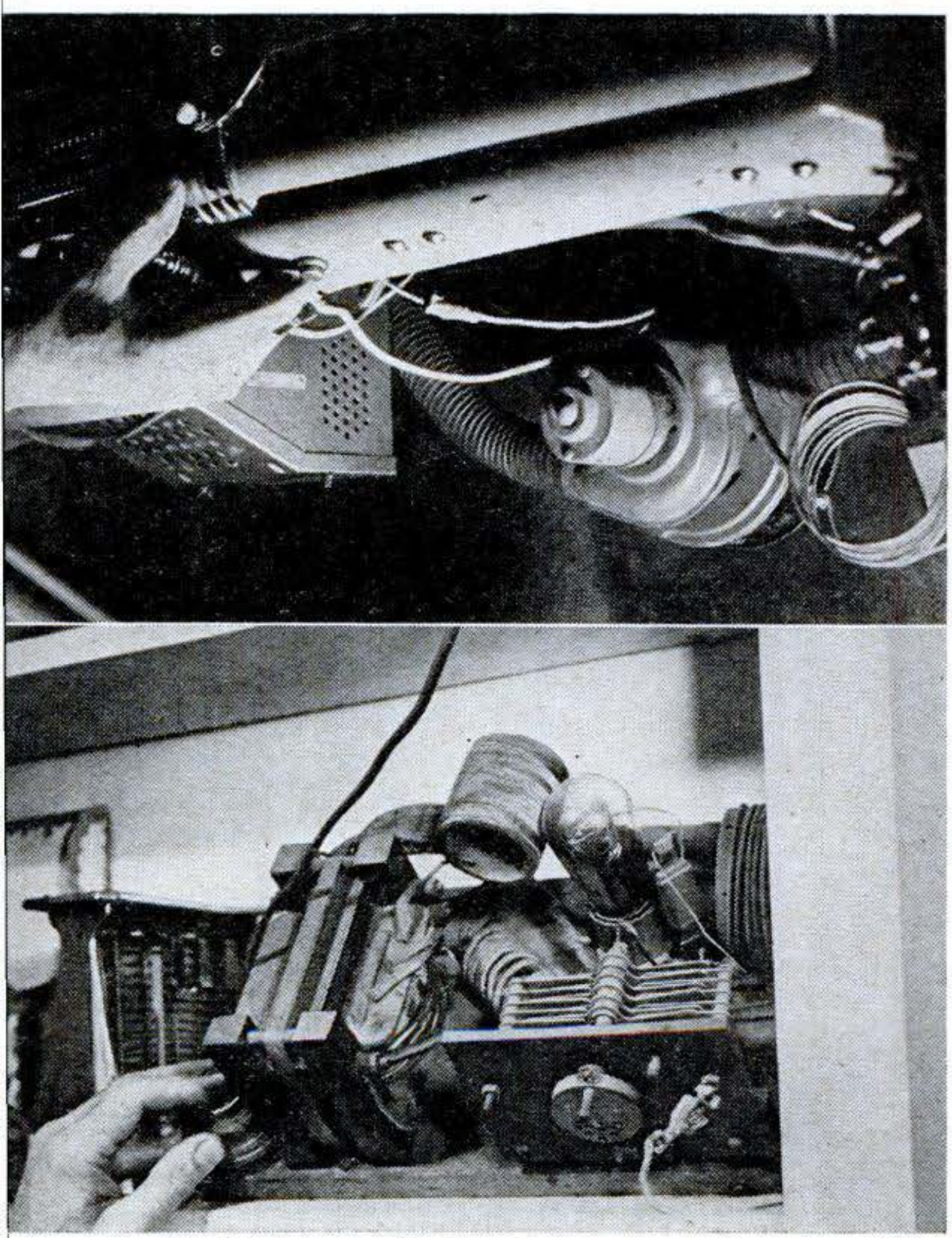
Copyrighted material



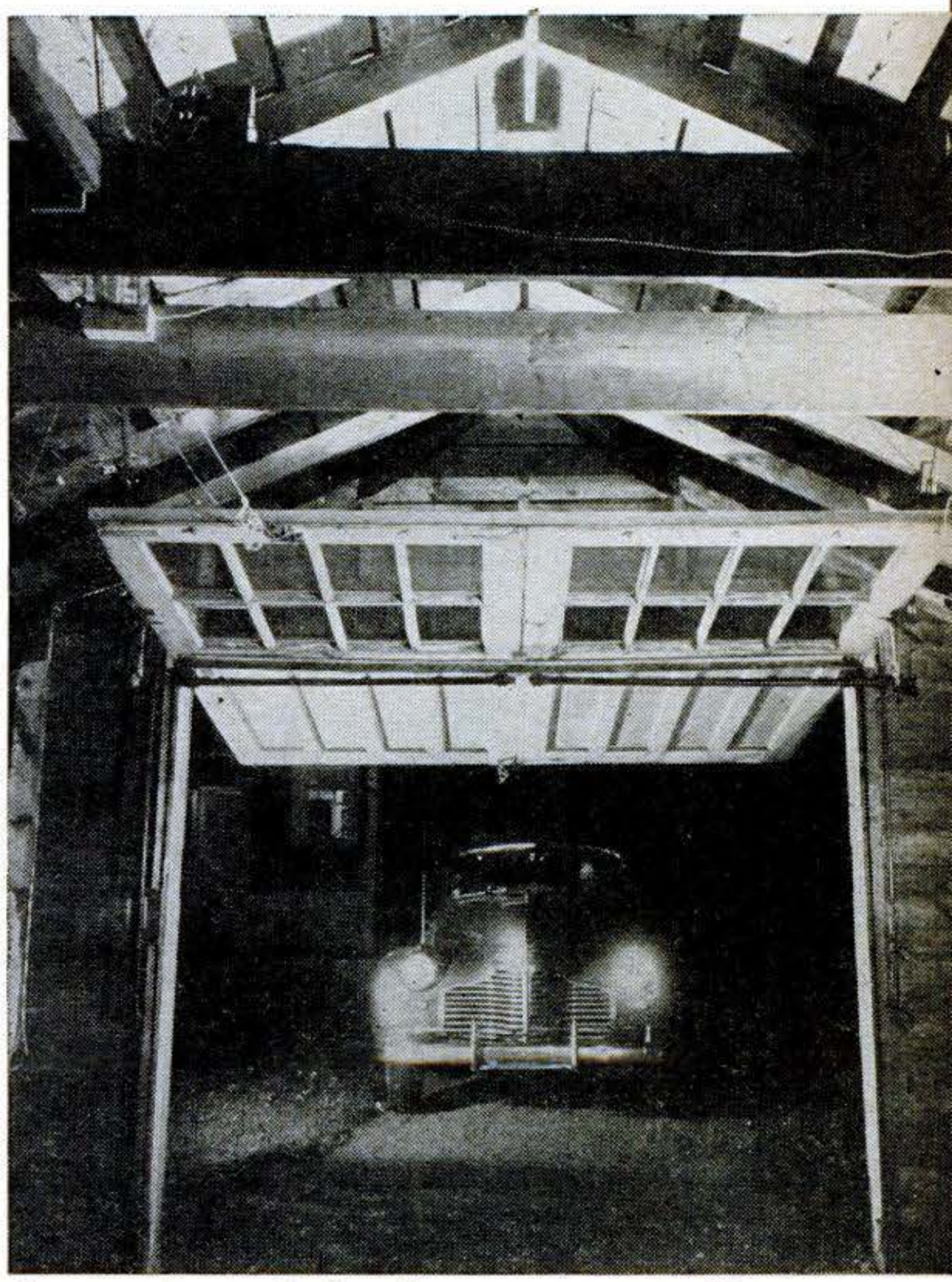
When Mrs. Kearsley drops her ironing to answer the phone, and it's an old friend, she needn't interrupt conversation to turn off the iron. Automatic timer built by Kearsley does it for her after preset number of minutes. Slow-flowing, GE bouncing putty oozes through aperture in spring mechanism, letting cover turn and trip key switch. A similar timer douses cellar light after user comes upstairs.



While she is on a drive, Mrs. Kearsley indulges her fondness for afternoon tea with aid of this set her husband made for her from a paint can, resistance wire, and a handy piece of laboratory glassware. Taken from glove compartment, heater plugs into socket on dashboard, as shown, to use current from car's battery. It boils the water in 10 minutes. Separate containers provide all the fixings.



Radio control for his garage doors enables Kearsley to open them from driver's seat of his car, or before stepping out of the house in stormy weather. He can also close them after he comes indoors. Push button beneath dashboard, in upper view above, operates car transmitter that does the trick. Transmitter in lower view, also worked by push button as shown, is on kitchen shelf near back door.



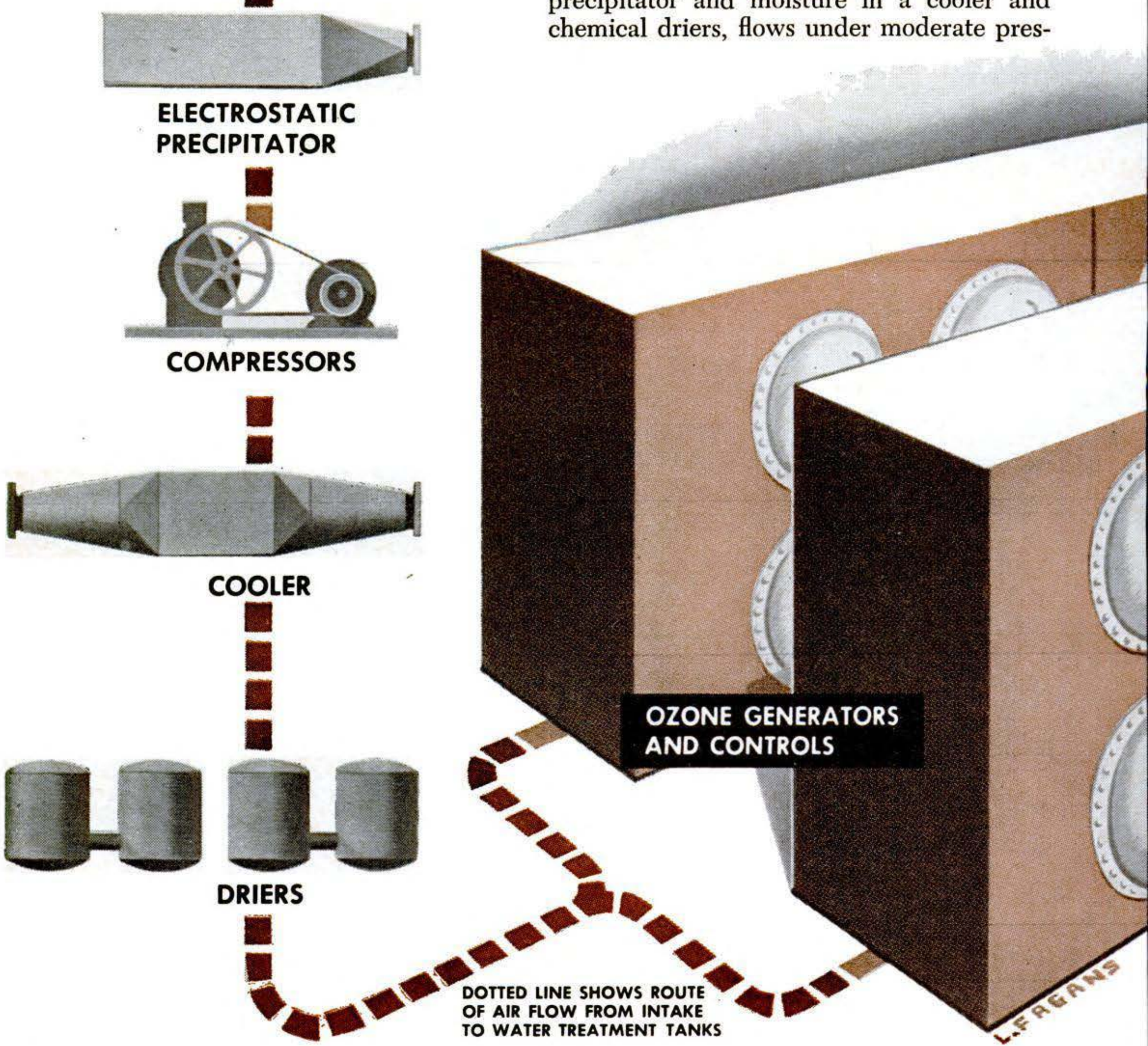
Garage doors obediently swing open as Kearsley, turning into his driveway, touches push button in car. Receiver on wall picks up signal and actuates homemade system of motors, cables, and counterweights that tilt and raise door frame. Next time receiver picks up a signal, which will come from set in house after Kearsley has gone indoors, it will operate system in reverse to lower the doors again.

Copyrighted material

How Biggest Ozone Plant In the World Will Work

PHILADELPHIANS will enjoy purer and tastier drinking water when the world's largest ozone-generating plant, designed by the Welsbach Corporation of Philadelphia, goes into action this summer. Fifty ozone generators resembling fire-tube boilers, each one containing 85 four-foot electric glow discharge tubes operating at 15,000 volts, will manufacture a total of 1,250 pounds of ozone a day. The powerful oxidizing action of this gas will banish any trace of undesirable taste and odor from 36,000,000 gallons of Schuylkill River water daily, leaving it fresh and pleasing to the palate. In addition, the ozone will destroy harmful bacteria, and will precipitate iron that might otherwise stain household fixtures.

The pictorial flow sheet shows how the new plant will work. Clean, dry air, provided by removing dust in an electrostatic precipitator and moisture in a cooler and chemical driers, flows under moderate pres-

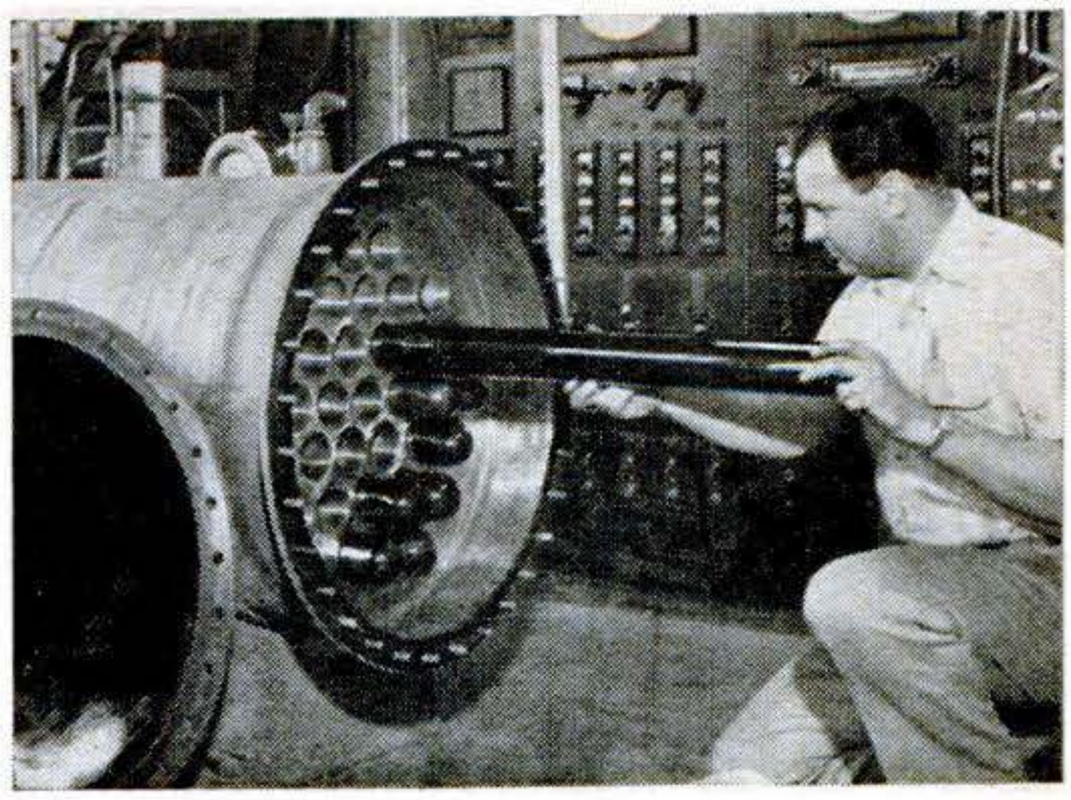


Copyrighted material

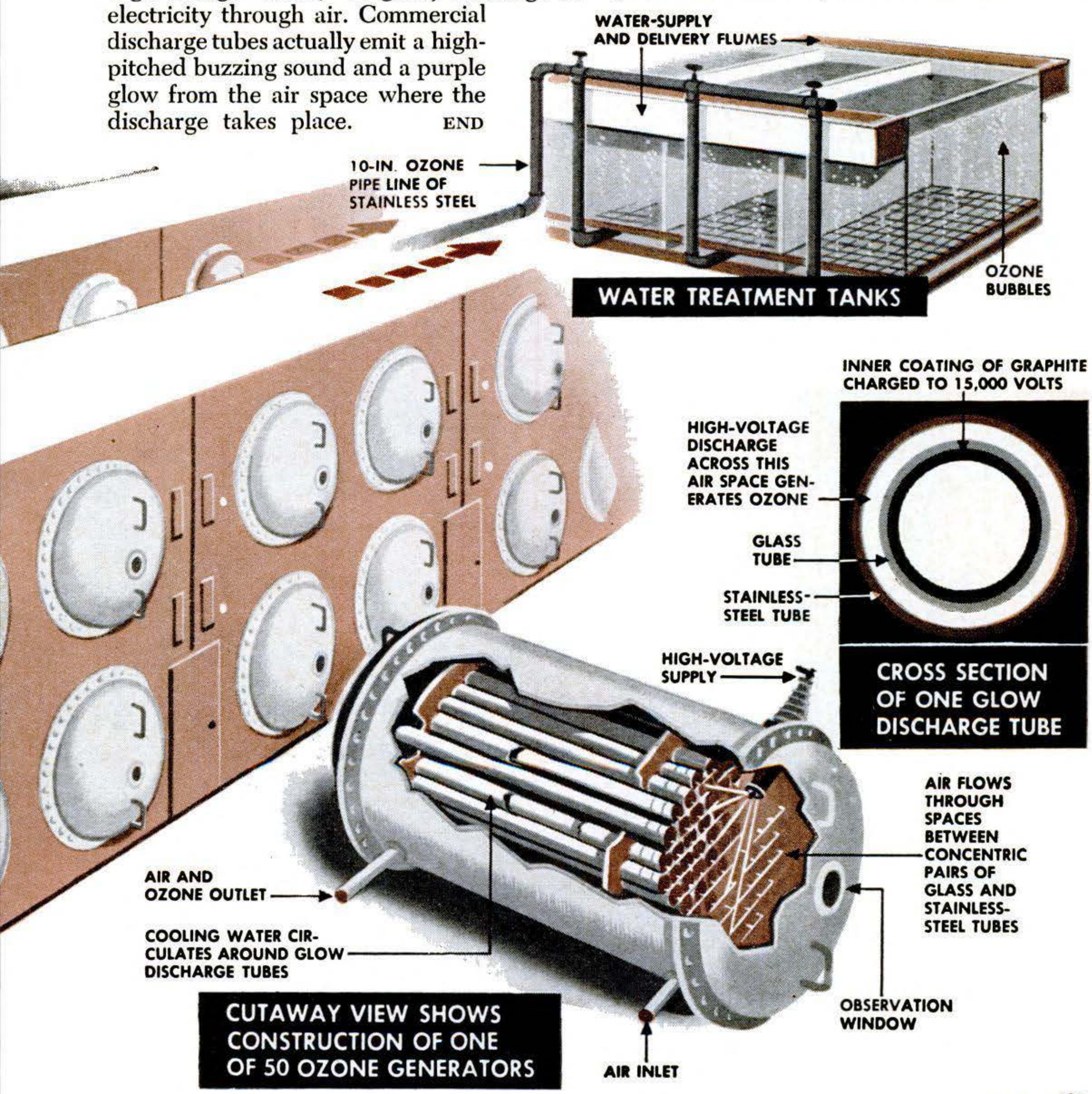
sure through the high-voltage chambers that convert part of its oxygen to ozone. The ozone-bearing air then bubbles upward through water in treatment tanks.

More expensive than chlorine for disinfection alone, ozone pays its way when chemical waste from near-by industrial plants makes the water taste bad. Unlike chlorine, ozone can leave no taste of its own, since it rapidly turns back into oxygen. It has been used widely abroad. The largest American ozone plant to date treats 3,000,000 gallons of water daily at Whiting, Ind.

Ozone, whose interesting properties are described on pages 234-236, is the faintly blue, pungent-smelling gas produced by a high-voltage "silent," or glow, discharge of electricity through air. Commercial discharge tubes actually emit a high-pitched buzzing sound and a purple glow from the air space where the discharge takes place. END



Fifty ozone generators in new plant will be larger counterparts of this one. Photo shows a high-voltage, graphite-lined glass tube being placed in its tubular, stainless-steel cell.



CUTAWAY VIEW SHOWS CONSTRUCTION OF ONE OF 50 OZONE GENERATORS

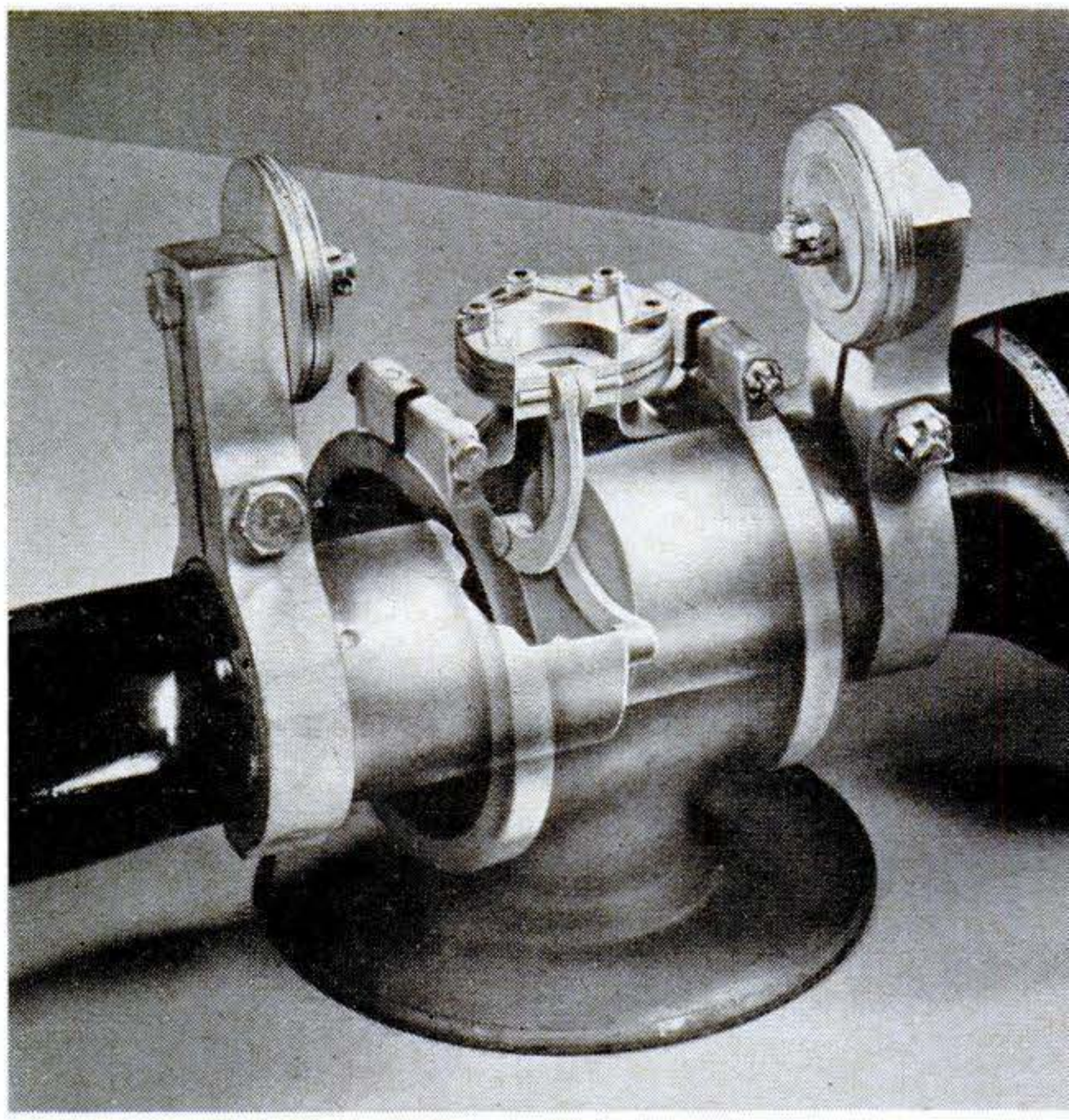
Copyrighted material

Propeller Adjusts Itself

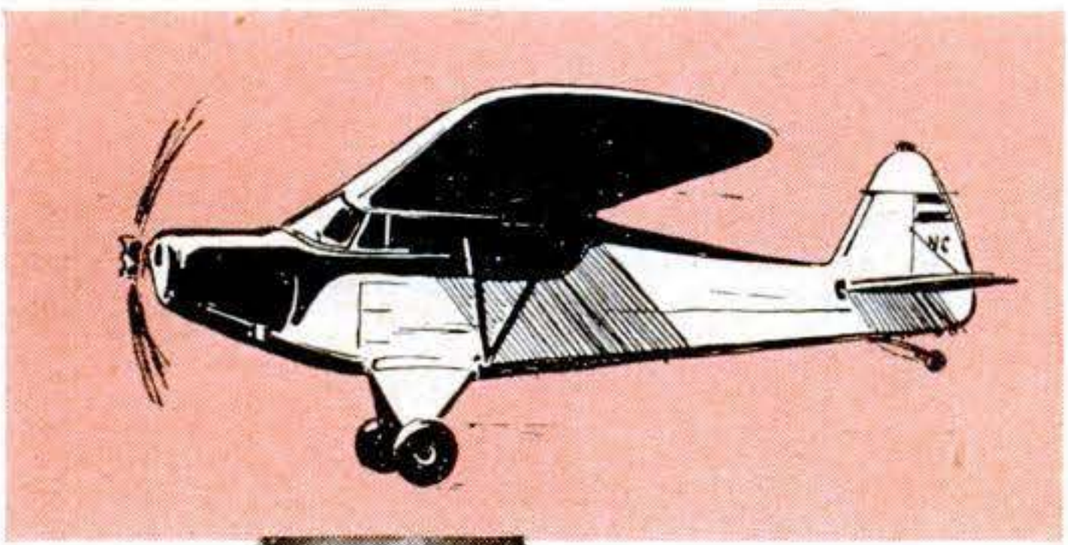
THE dream of every lightplane pilot, a fully automatic-pitch propeller, has come true. Climbing, the new Aeromatic Ⓣ goes into flat pitch to obtain maximum pull. Cruising or gliding, it increases its pitch to boost the speed. There is no cockpit control, the prop thinks for itself.

A simple hub assembly, in which centrifugal force does most of the work, contains two counterweights and a synchronized piston. The propeller blades are set at a slight angle to the hub, so that they lag behind it in the plane of rotation.

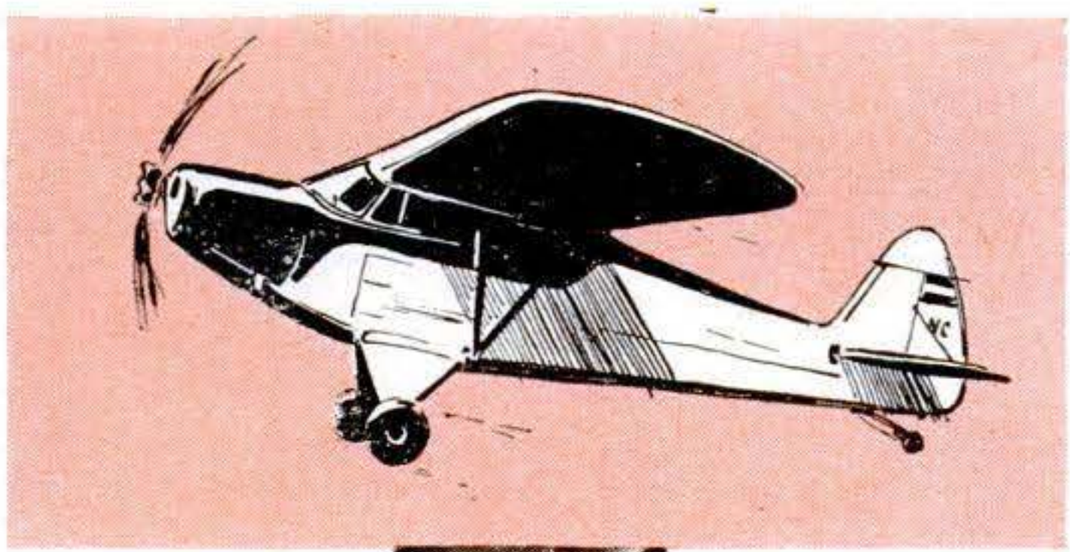
During installation, adjustments for the desired limits of pitch range, for balance, and for the combination of aircraft and engine can all be made without opening the sealed hub. The manufacturers, the Bartlett Hayward Division of the Koppers Co., of Baltimore, claim that the prop not only provides maximum plane performance for a given fuel consumption but saves engine wear and tear by preventing overspeeding.



Cutaway of AeromaticⓉ automatic-pitch prop, above, shows how blades are connected inside hub. Two link arms and a piston take the place of gears. Disks on two upright arms are counterweights that automatically control the pitch as shown in drawings and photographs below.

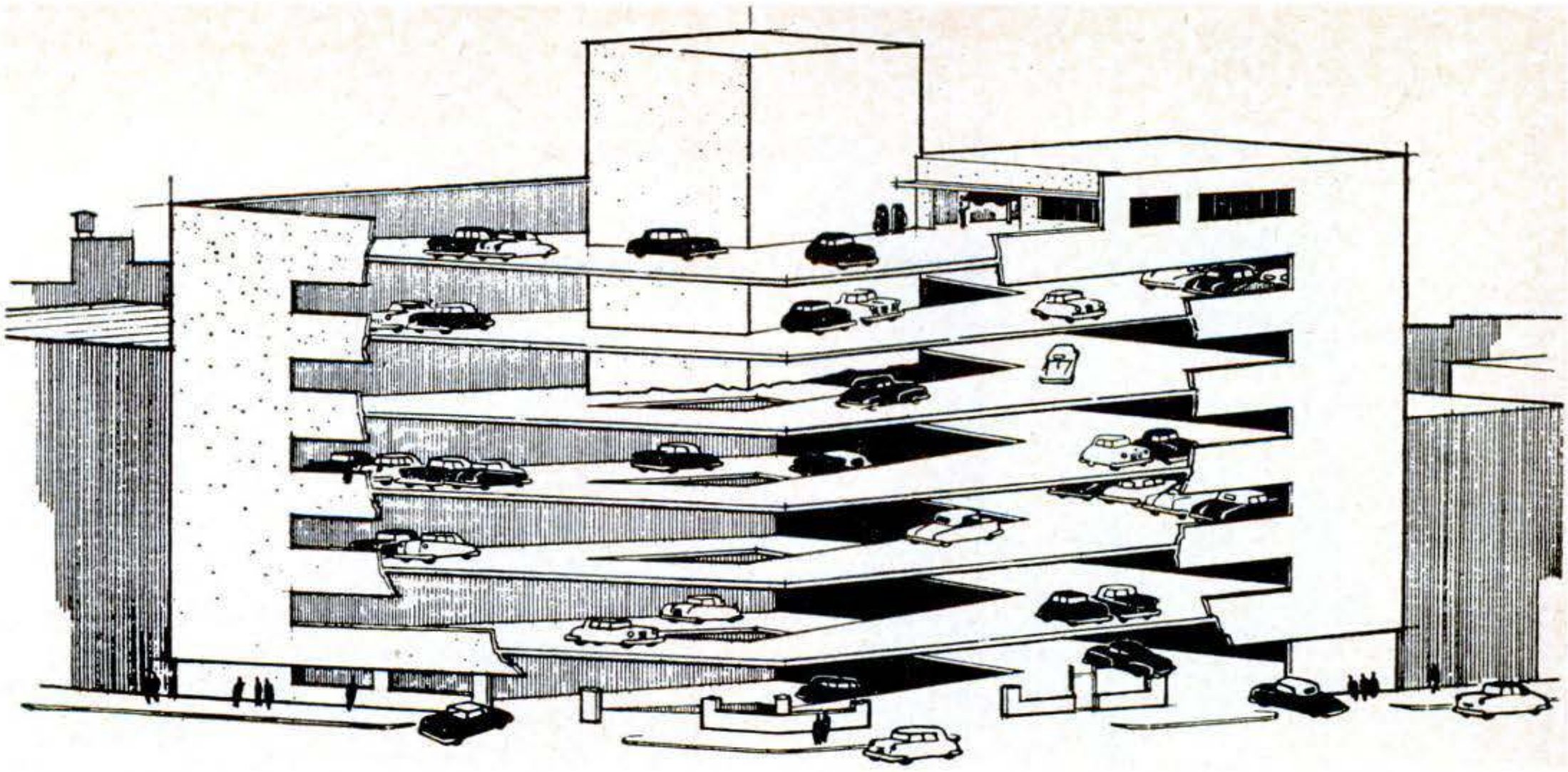


In level flight, load on engine lessens, prop speeds up. Increased centrifugal force now tries to push counterweights away from center, but, due to the way arms are set, instead pulls them apart like opening scissor blades. This increases prop pitch for added bite and more speed.

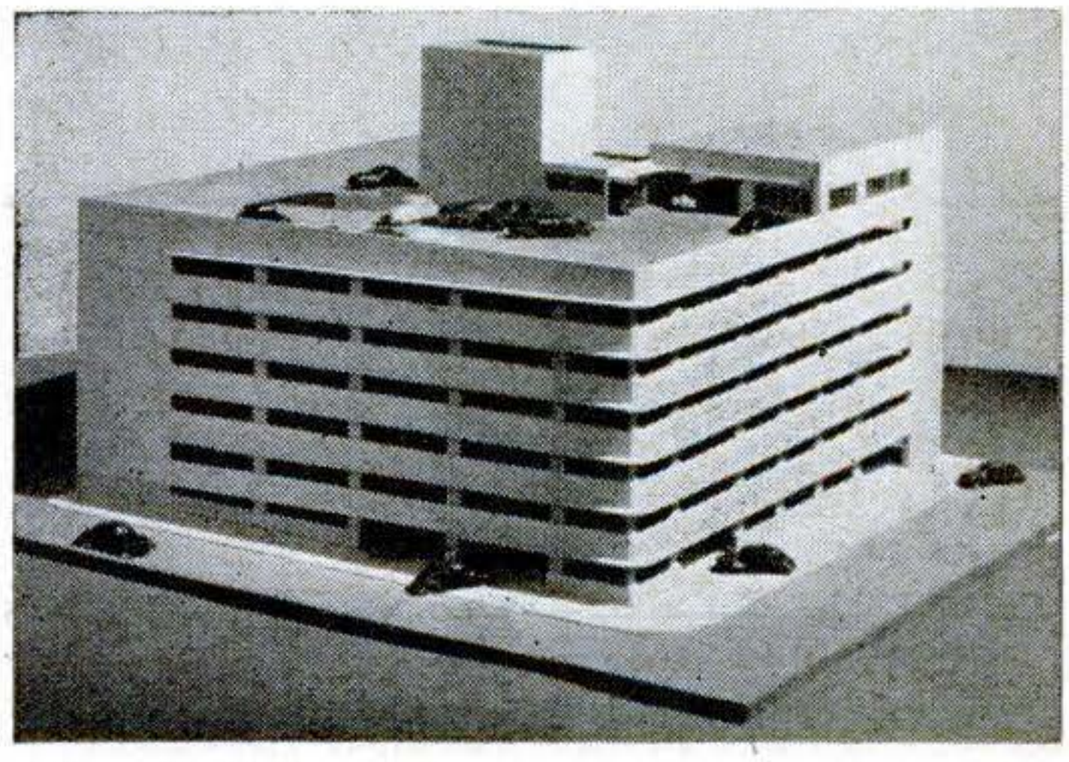


Climbing flight increases load on engine and prop slows down. Centrifugal force is reduced, allowing aerodynamic thrust to flatten blades. Counterweights move toward each other like closing scissors, lowering blade pitch and increasing their power to pull the airplane.

Copyrighted material



Spiral Floor Eases Parking Headaches



A SINGLE continuous floor twisting like a corkscrew from the first to the sixth story makes this modernistic garage truly self-parking. The floor, wide enough for two-way traffic, spirals upward on a four percent grade around a central core containing a passenger elevator and stairway. Parking stalls are in a 20-foot-wide parking strip running along the walls from basement to roof. To park, the driver simply pulls into a vacant space. On leaving, he backs his automobile into the down-traffic lane and drives to the exit at the street level.

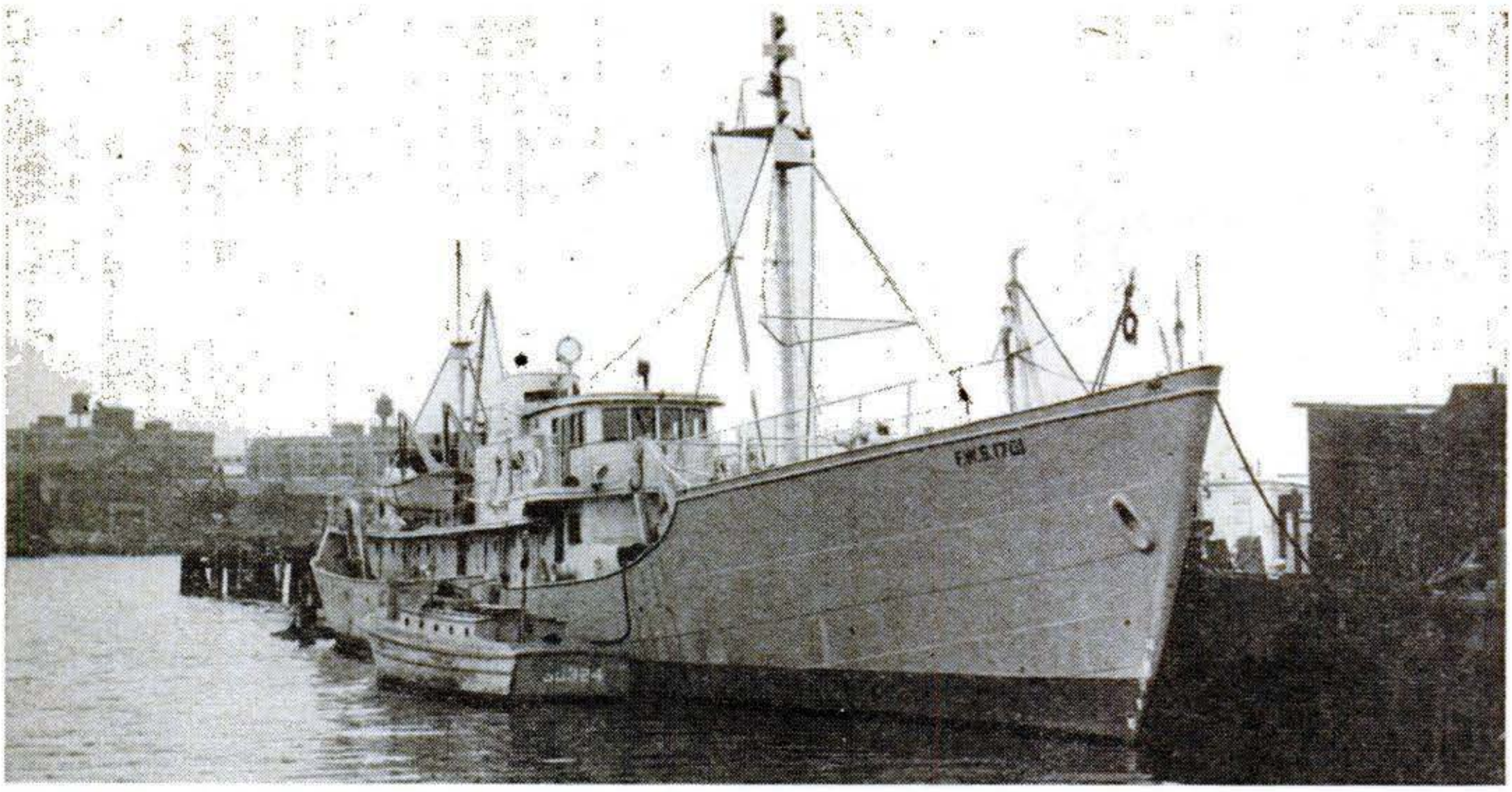
Designed to go with a large Los Angeles office building, the garage occupies a lot 145 feet wide and 152 feet deep. It will accommodate 446 cars. Service facilities are provided for on the top floor.

Tugs Hitch Ocean Ride

WHEN Argentine interests bought six, 74-foot, steel Army-surplus tugs, the problem was how to transport them to Buenos Aires. Running them the 10,000 miles from Seattle under their own power would be too costly and too hazardous. They couldn't be shipped for lack of a crane at the destination large enough to unload them.

The Atlas Steamship Chartering Corp. came up with an ingenious solution. The small tugs were float-loaded on a 278-foot steel barge, and towed by a large ocean-going tug. The photograph at left shows the barge being raised in the dry dock in which it had been submerged while the six tugs were floated on. At the destination, arrangements were made for the process to be reversed, the barge again being submerged in a dry dock while the tugs were floated off.

Copyrighted material



The *Albatross III*, seagoing laboratory, prepares to solve the mystery of the missing fish.

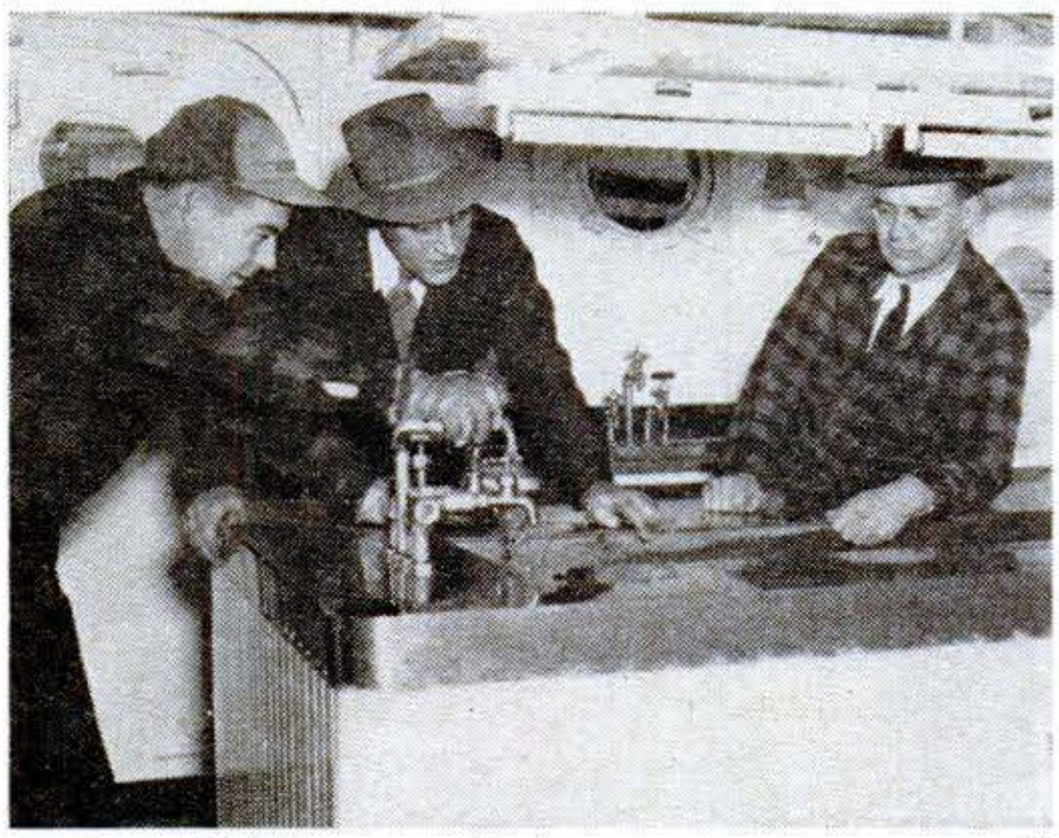
Seagoing Lab Tracks Fish

THIS month a shipload of scientists with the latest oceanographic gear will sail on one of the most important fishing trips on record. They won't bring back many fish, but their findings may tell why there has been a drastic decline in commercial catches from the 20,000-square-mile Georges Bank and other New England fishing areas.

The scientists, from the U. S. Fish and Wildlife Service, will study sea life, make a fish census, and test less wasteful fishing methods. Instruments on their 180-foot ship will record currents and ocean topography.

Super-sensitive sound-beam depth finder, above, records inch-accurate soundings, can detect fish schools close to the bottom. A submarine camera permits direct study of sea life.

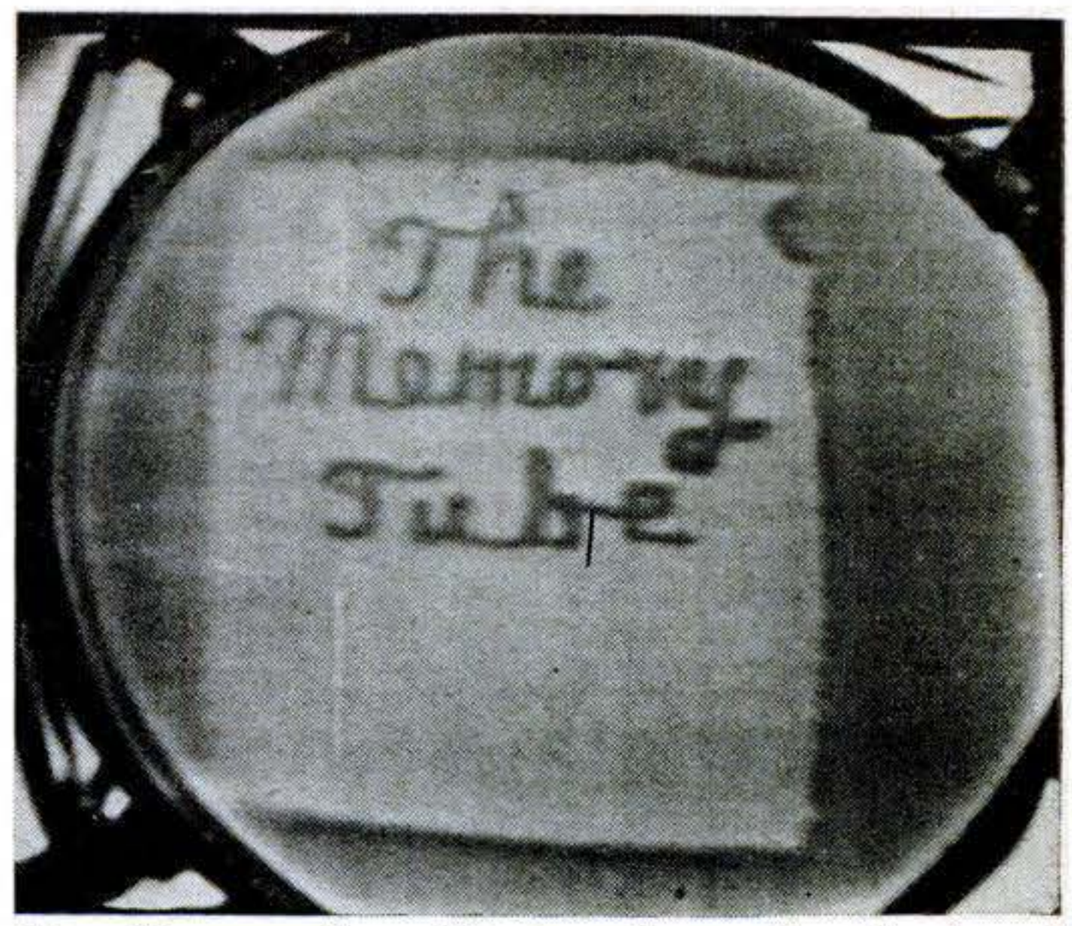
War-developed Loran, above, will be used to chart important spots on Georges Bank, where strong currents balk ordinary surveys. A bathythermograph will record water temperatures.



In "wet" laboratory's large, open, water tank scientists will observe fish specimens at close quarters. In "dry" lab adjoining it, they will make chemical analyses of sea-water samples.

Copyrighted material

The Navy's new electronic memory tube looks a bit like an ordinary cathode-ray tube, but is far more complex. It remembers electric signals by spraying a charge pattern on an insulator.



The "remembered" signal can be displayed on a cathode-ray tube (above). In this case, the signal originates in an optical pickup device, such as facsimile or television equipment.

This Tube Remembers Whatever It's Told

FULL-COLOR, three-dimensional radar and sonar are promised by a new vacuum tube that remembers signals as long as you want it to. It can also be used to communicate by very quick electrical flashes, as the "memory" part of an electronic computing machine, and to catch and record quick flashes of all kinds (such as radio-control signals employed by an enemy in wartime).

The memory tube, developed at the Naval Research Laboratory under direction of Andrew V. Haeff, is built something like an ordinary cathode-ray tube. It paints an electronic "picture" of the signal it is to remember, and reads it back whenever desired.

In the new tube there are three electron beams. The writing beam sprays a pattern of electrical charge that corresponds to the signal. It is controlled by deflector plates to which the signal is fed. The holding beam sprays electrons evenly all over the target to replace the charges picked up by the reading beam. The reading beam moves over the target in the zigzag pattern used in television. Whenever it runs across a charge left by the writing beam, that charge flows from the target to a near-by metal screen.

The current—or "remembered" signal—from the pickup screen can be fed to other circuits or devices, such as an ordinary cathode-ray tube. In the case of the cathode-ray tube, its beam is synchronized with the reading beam of the memory tube so that it makes the fluorescent screen of the cathode tube glow every time the reading beam "sees" a charge on the memory-tube target. Thus the *charge* pattern on the memory-tube target appears as a *light* **pattern.**

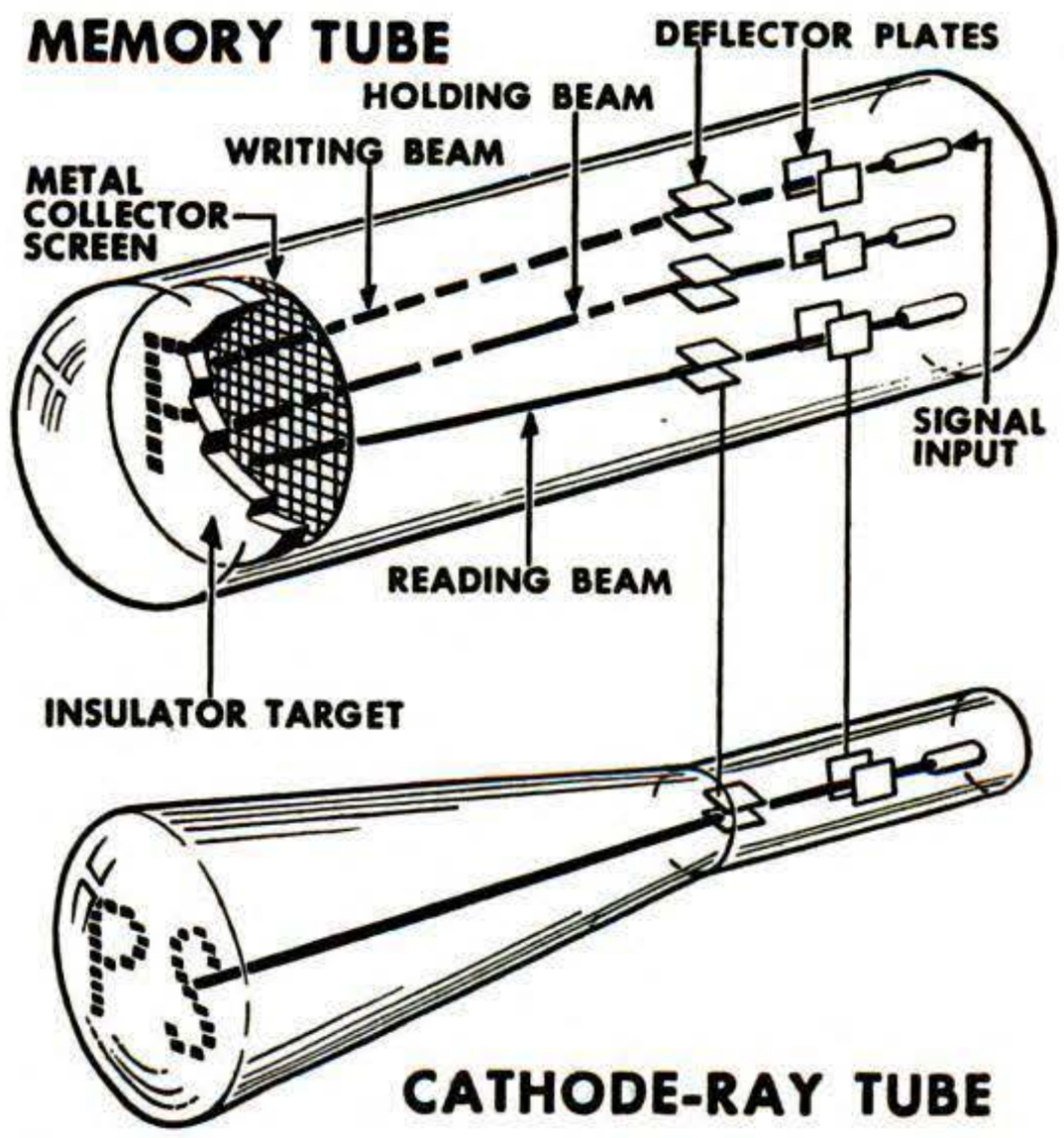
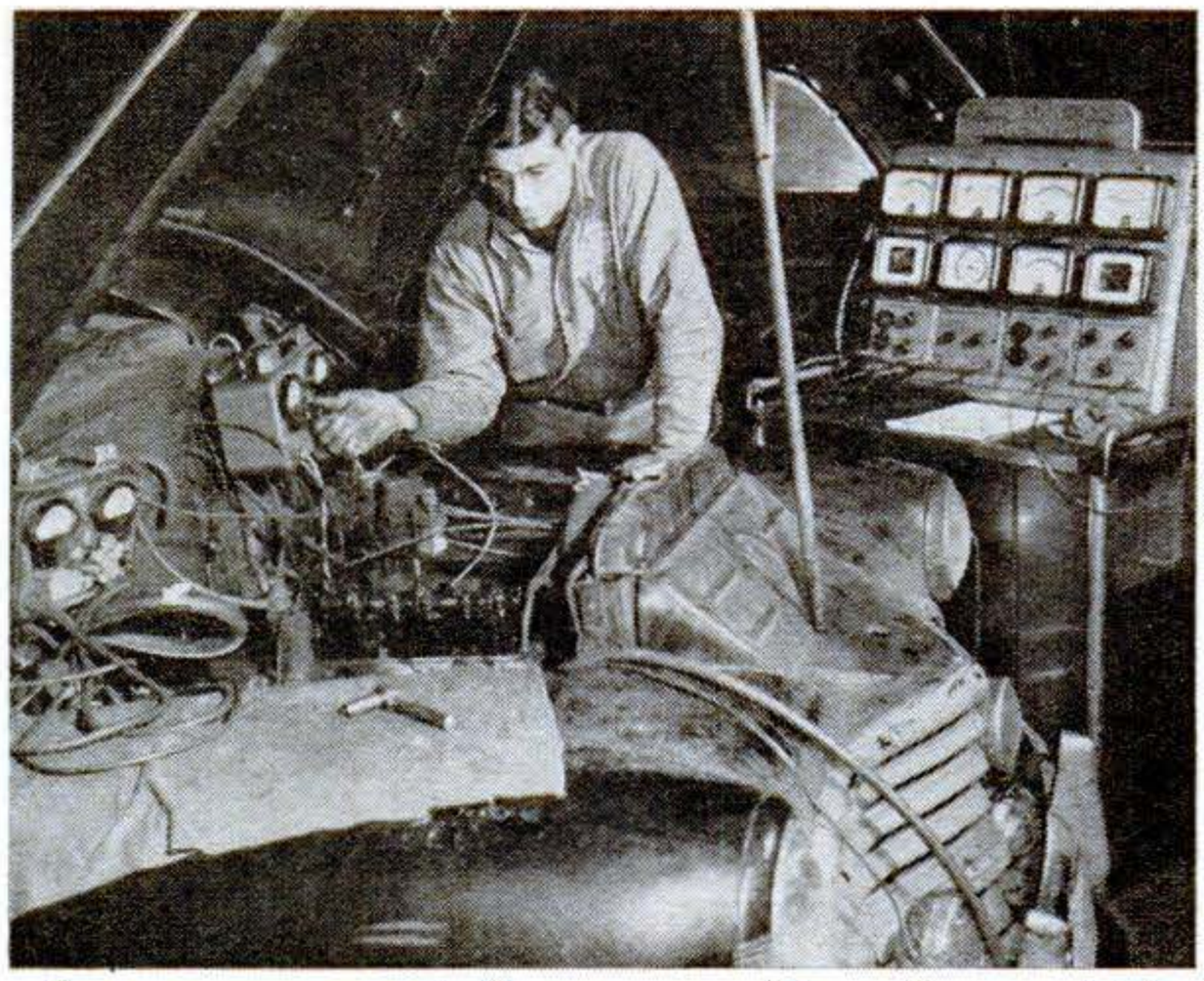


Diagram shows construction of tube and hookup for visual display of signal. The pattern of charge on the insulator target cannot be seen and need not be made visible, since it might be fed to any one of many different types of apparatus—a computing machine, for example.

Copyrighted material

Next best to getting a new car is to inject new life in the old one. The right kind of servicing does just that.



Instrument tests help spot trouble points quickly.

How an Expert Does a Tune-up

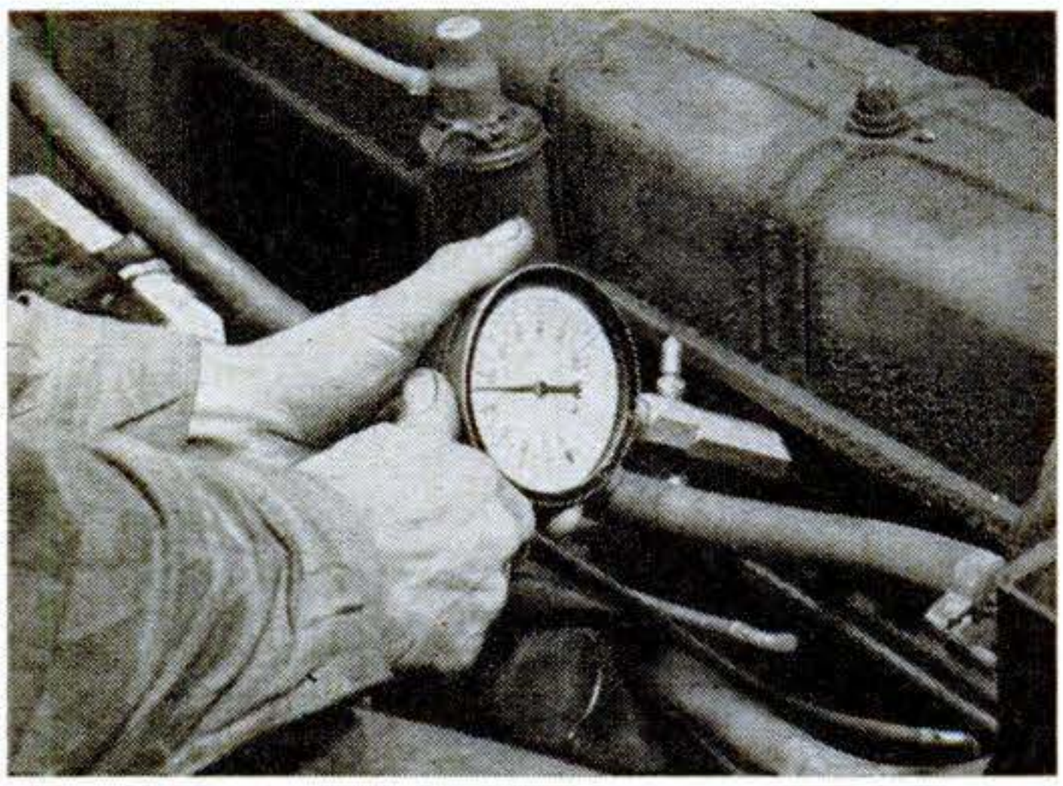
By R. P. Stevenson

PS photos by Hubert Luckett

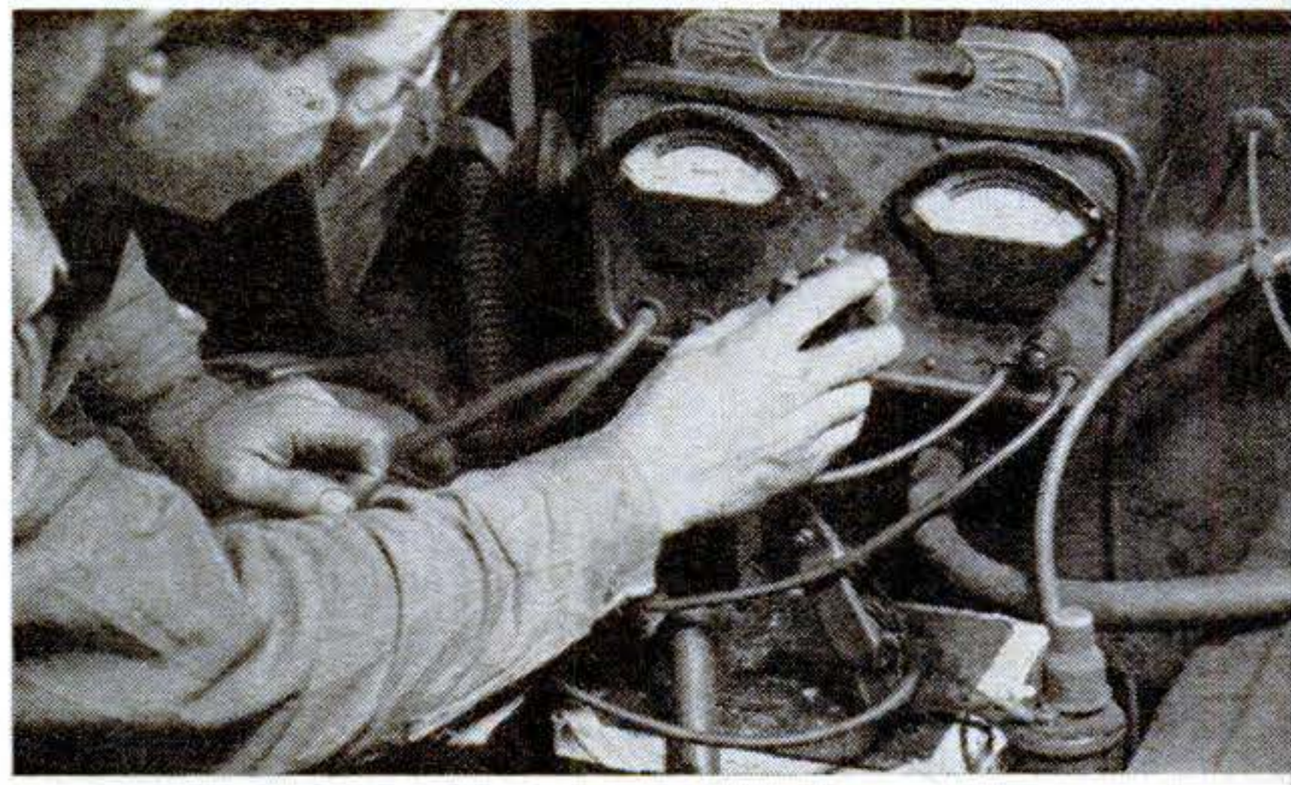
WHAT *is* an engine tune-up, anyhow? Like the blue-plate special, a lot depends on where you buy it. Different manufacturers specify different procedures, and further variations are introduced from shop to shop and mechanic to mechanic. Sometimes the job is done with little more than a few hand tools and a well-pitched ear; at others it's turned out with enough diagnostic instruments to stock a flight engineer's panel.

However it's done, the underlying idea is to restore some of the efficiency that the engine has lost through use and wear. These inevitably bring a gradual decline in engine performance; vibration jars precise adjustments out of kilter; contacts and electrodes pit and burn away; filters choke up with dirt or sludge; and friction and heat do the rest.

That's why your engine needs a going-over at regular intervals. The job should give you quicker starting, more power and pickup, better gas mileage, and smoother

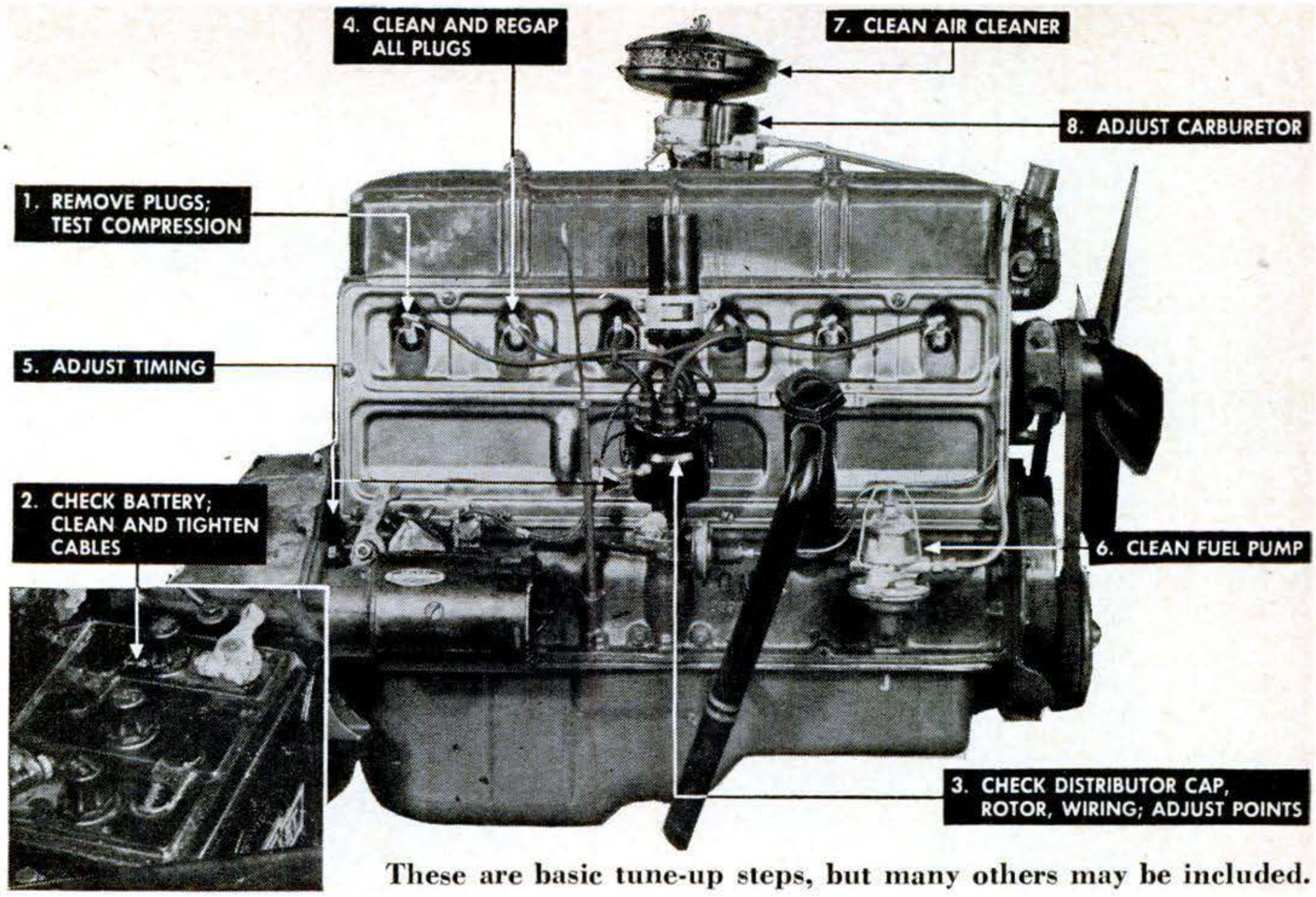


1. A compression test comes first. An engine cannot be tuned satisfactorily if compression is uneven. In such cases, a valve or a ring job may be required before the tune-up.



2. Good ignition depends on a battery in good shape. Here each cell is being checked under load. Corrosion is removed from terminals and cables examined.

Copyrighted material



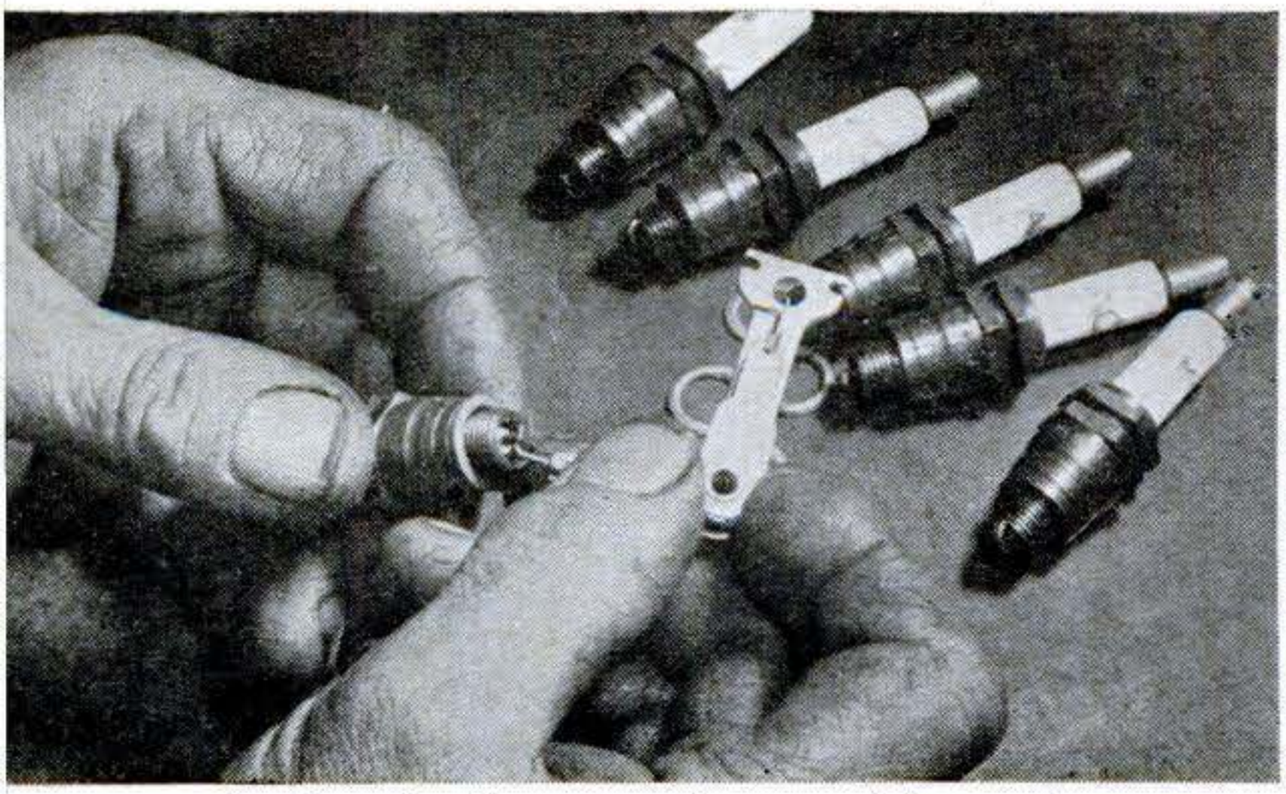
These are basic tune-up steps, but many others may be included.

idling. (In evaluating a tune-up your car has had, don't forget that the better shape it was in beforehand, the less improvement you'll notice.) A tune-up may also spot minor trouble before it becomes major, and for that reason alone is a good idea before any long trip.

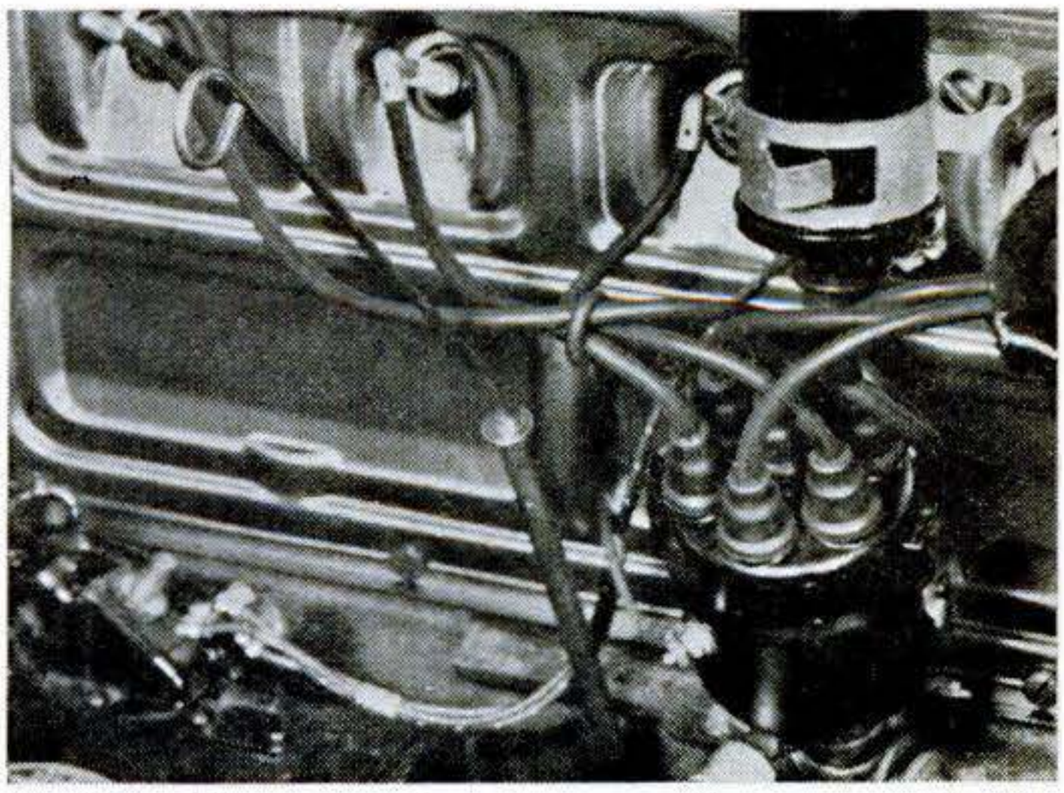
The accompanying photos show a tune-up done by a competent mechanic with modern equipment. This was an actual job done on a 1946 Chevrolet by John Riccardi, tune-up specialist for the East Side Chevrolet Corporation in New York City, who in his own words "began as a kid" and has "been at it for 20 years."

Most automobile manufacturers recommend an engine tune-up each 5,000 miles or twice a year, in the spring and fall, but hard usage under difficult conditions may make it advisable even more frequently. Spring and fall tune-ups coincide with conditioning the car—oil changing, addition or removal of antifreeze, and so on—for the season that's to follow.

Tune-up may be considered to deal mainly with three engine functions—com-

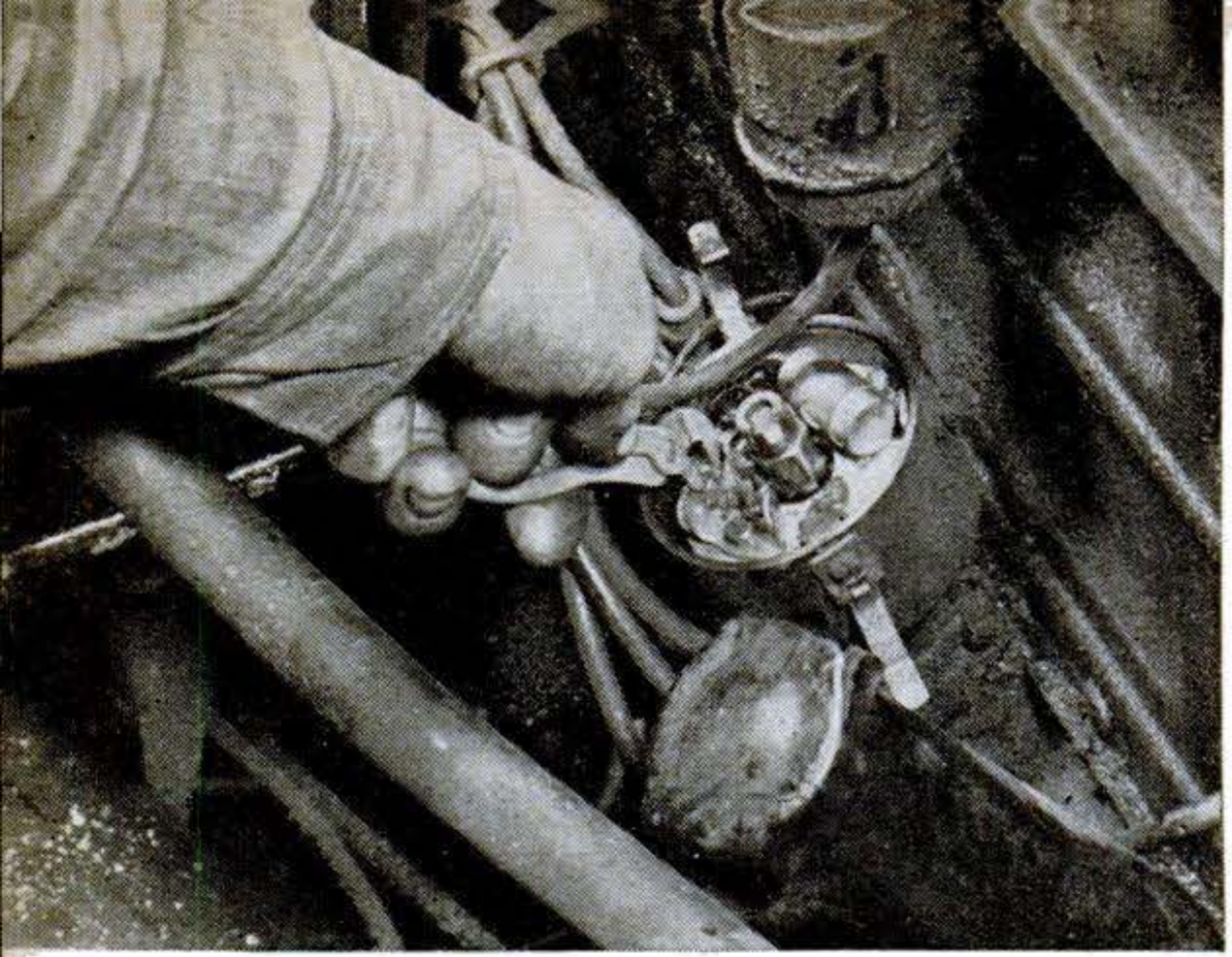


3. Spark-plug gap is set with a wire gauge, even when new plugs are installed as here. If old ones are retained, they're cleaned and inspected for cracks as well as regapped.

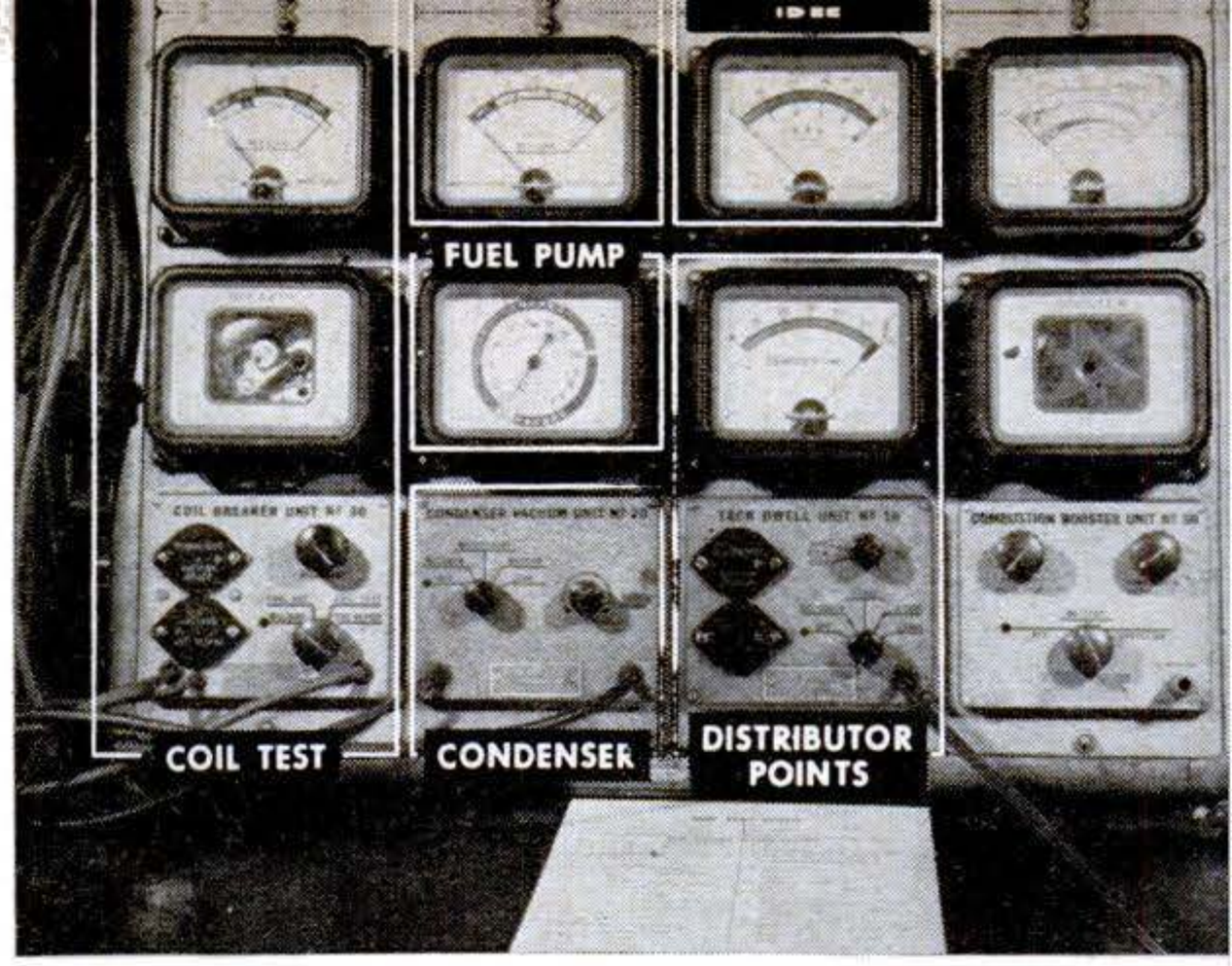


4. Distributor wires were all inspected for worn insulation. After removal, both the cap and rotor were checked for cracks, chips, and burning, and the cap wiped out with a cloth.

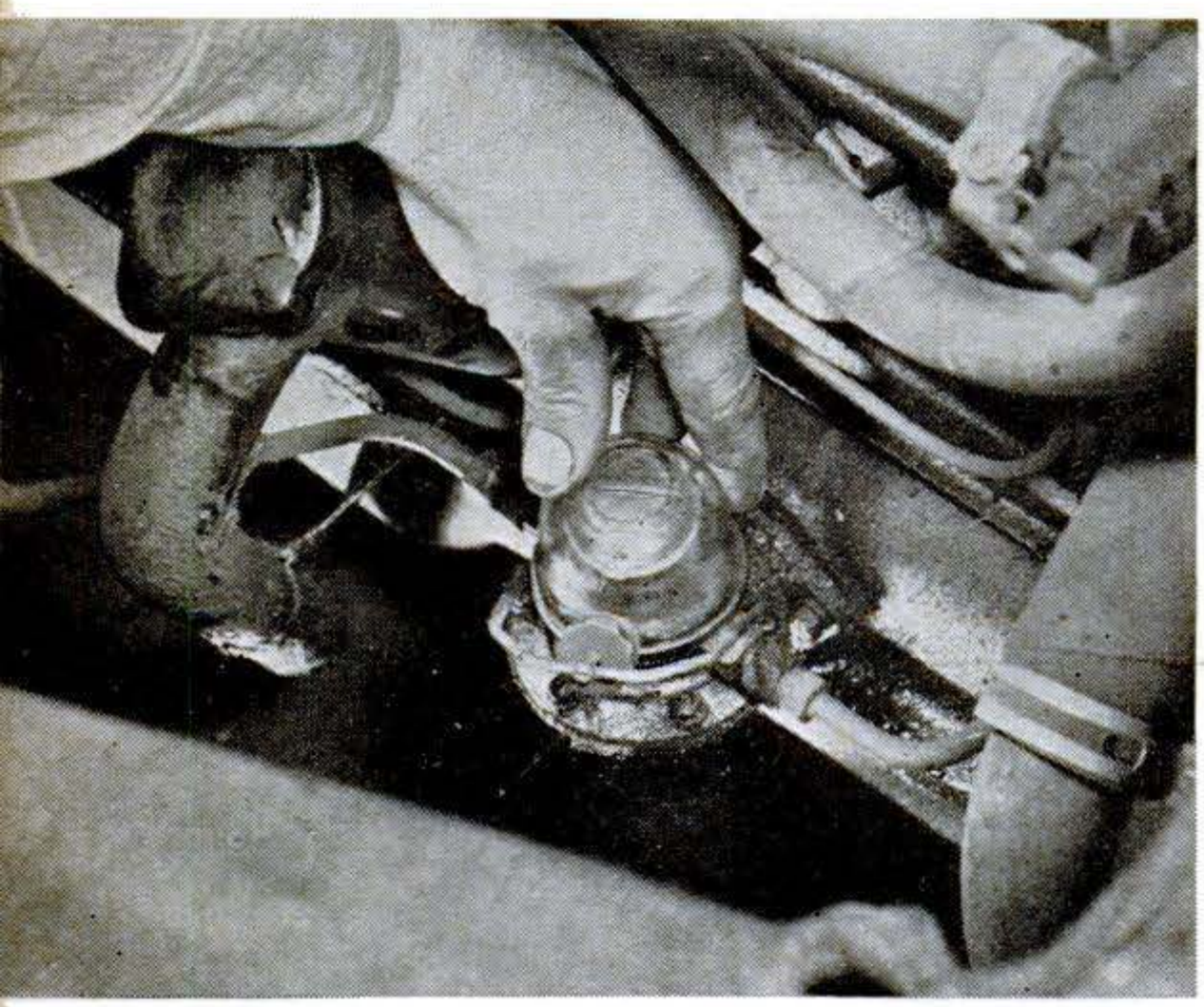
Copyrighted material



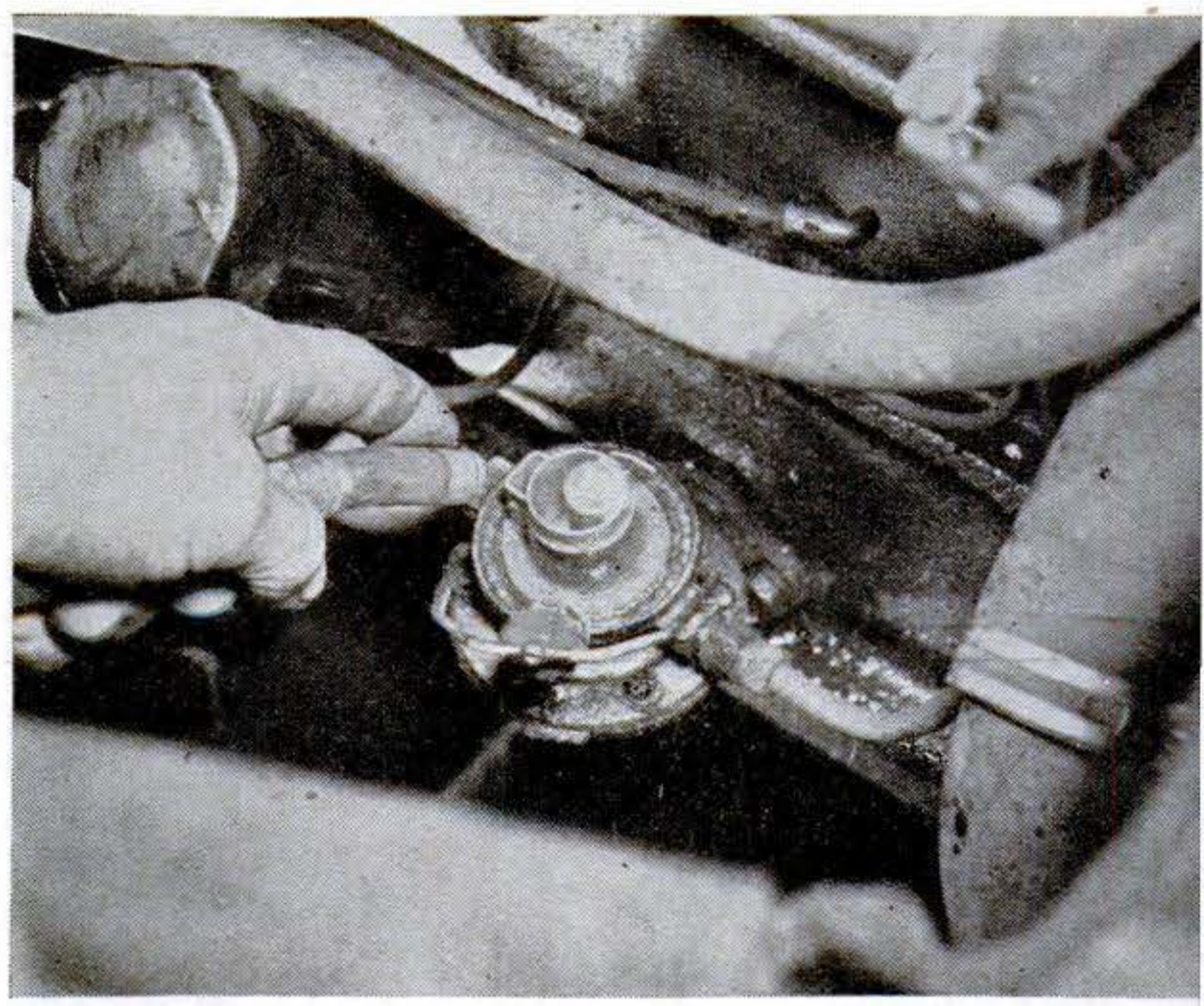
5. Contact points are removed from the distributor and cleaned with a fine-cut file. If the points are badly oxidized or pitted, new points and a new condenser are installed.



6. Degrees of dwell, registered on the motor tester, show whether point setting is correct. The machine also tests coil, condenser, fuel pump, and gives engine a final vacuum check.



9. The fuel-pump bowl is about to be removed here. The bowl was wiped clean and examined for cracks and chips, and the strainer freed of dirt with a blast or two from an air hose.



10. Water and dirt also were blown from the pump with a hose. A new gasket went into the pump when it was reassembled. The gas filter on the line at the carburetor was also cleaned.

pression, ignition, and carburetion. Each engine part affecting any of these is checked and then adjusted if necessary.

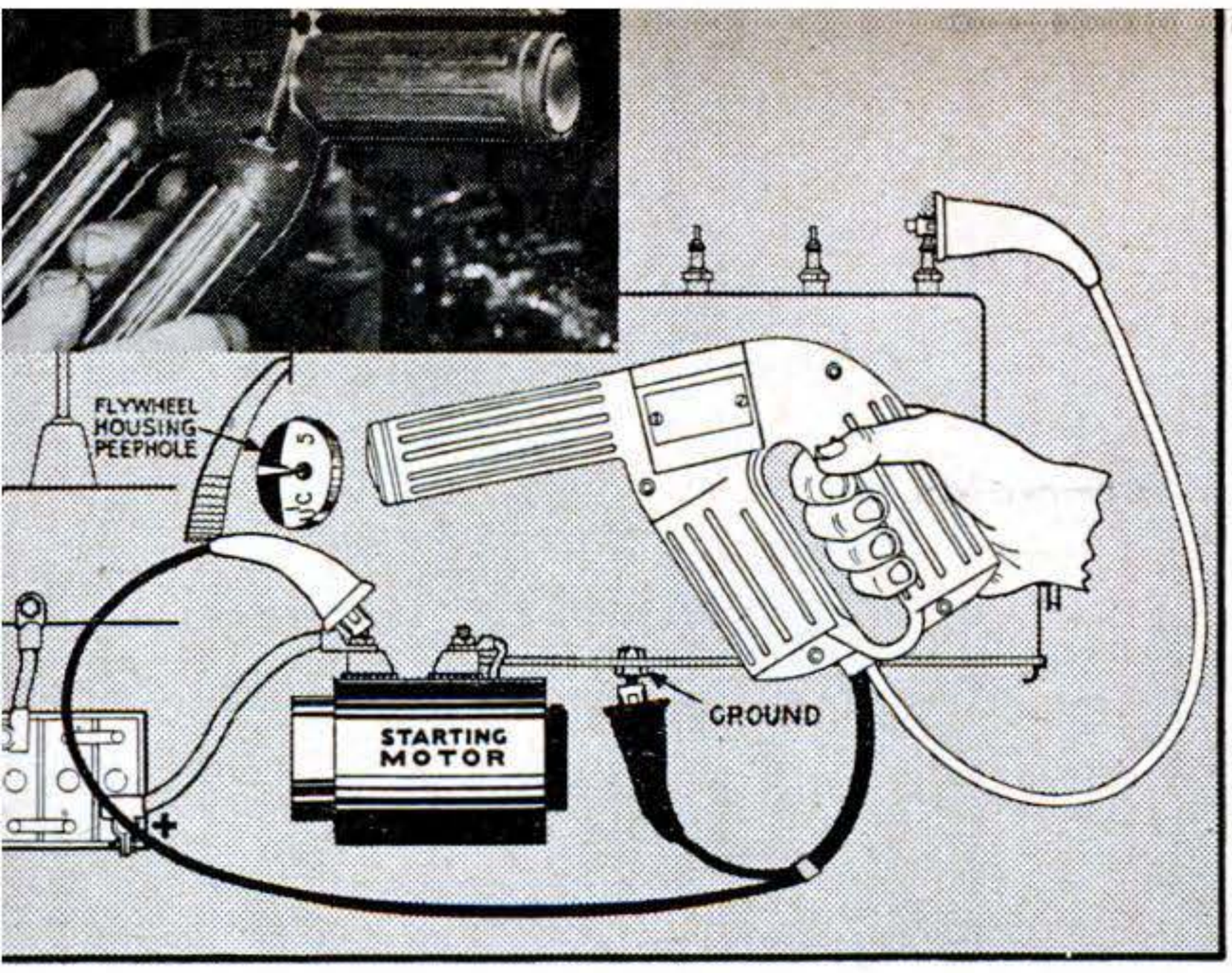
You may also have heard tune-ups classified as major and minor. As the word suggests, a major tune-up includes more steps than the minor. But there is no standardization. What one manufacturer or shop considers a minor tune-up may include steps that another may perform only in the event of a major job.

The tune-up illustrated here was classified as minor. However, the addition of only two other steps—overhaul of the carburetor and blowing out the fuel lines—would have raised it into the major class. In the photos, you will notice that the tappets were adjusted to the recommended clearances. This is a customary part of tune-up procedure for an overhead-valve engine. Although not illustrated, fan-belt tension also was adjusted, for slippage will affect generator output.

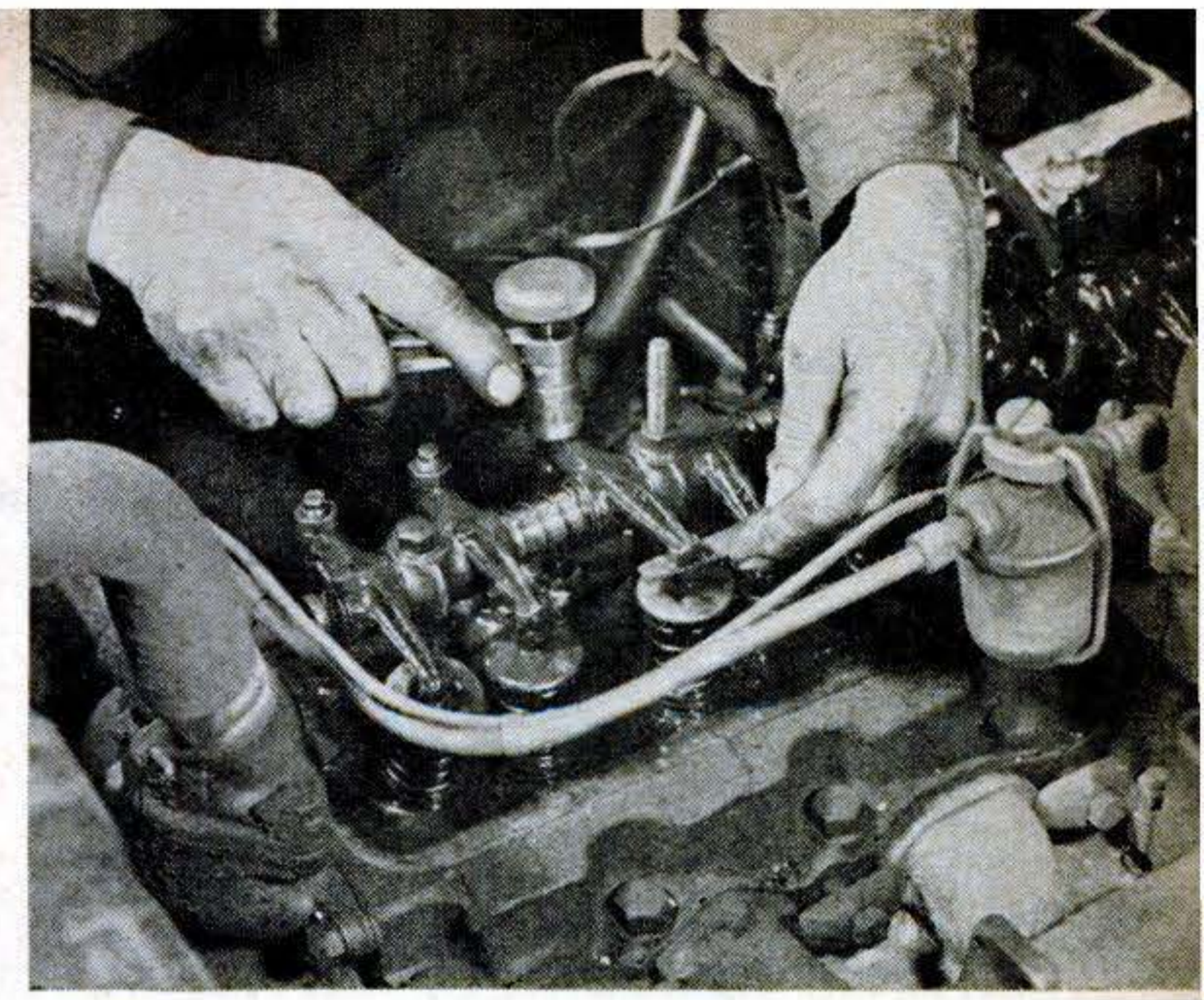
A more pronounced difference between a major and a minor tune-up is found in the factory recommendations issued for Buick. Here a minor job includes only four points—cleaning and adjusting the spark plugs, adjusting the distributor points, resetting the timing, and adjusting the carburetor.

On the other hand, Buick recommends that a major tune-up should include adjusting the distributor points, timing, carburetor,

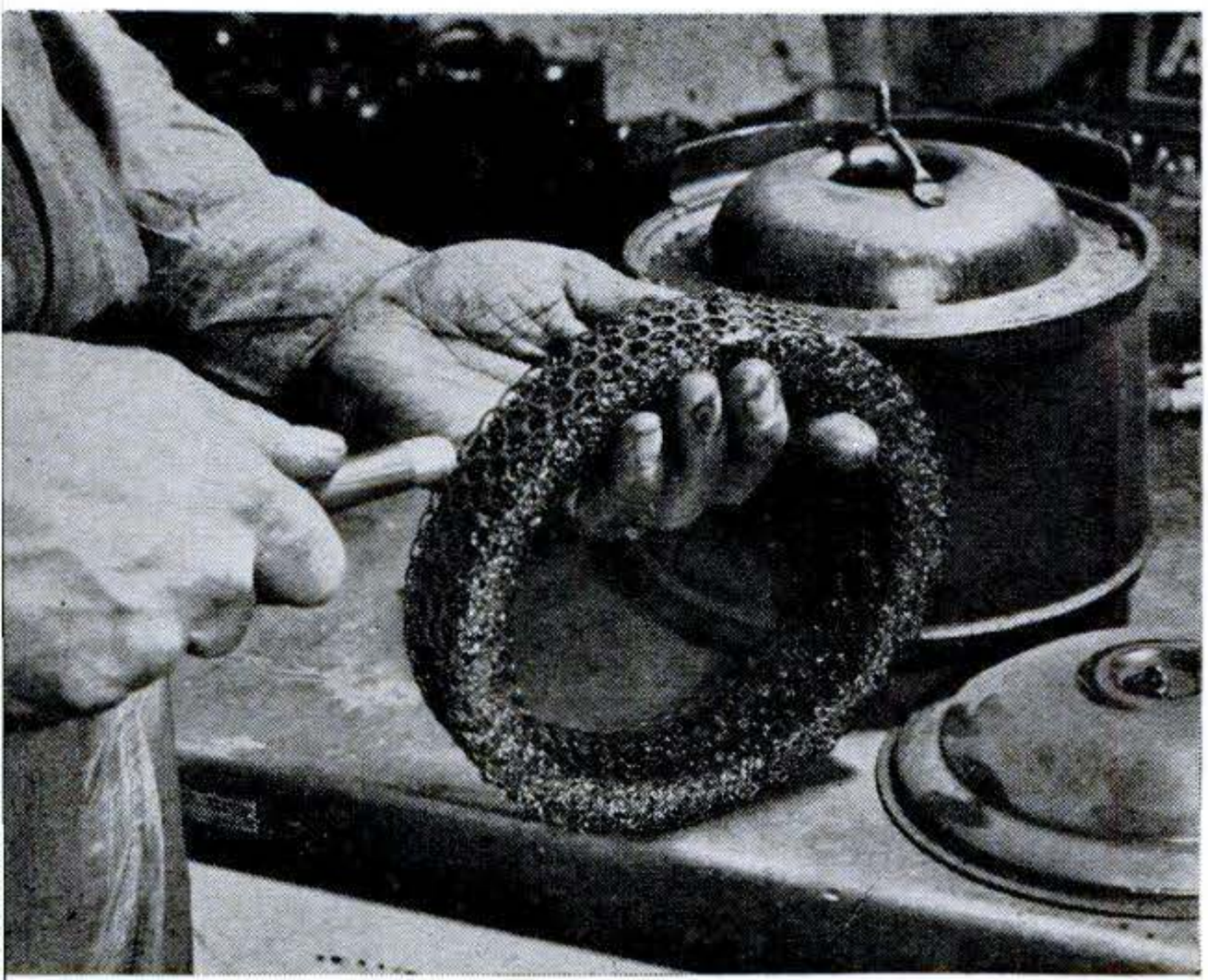
Copyrighted material



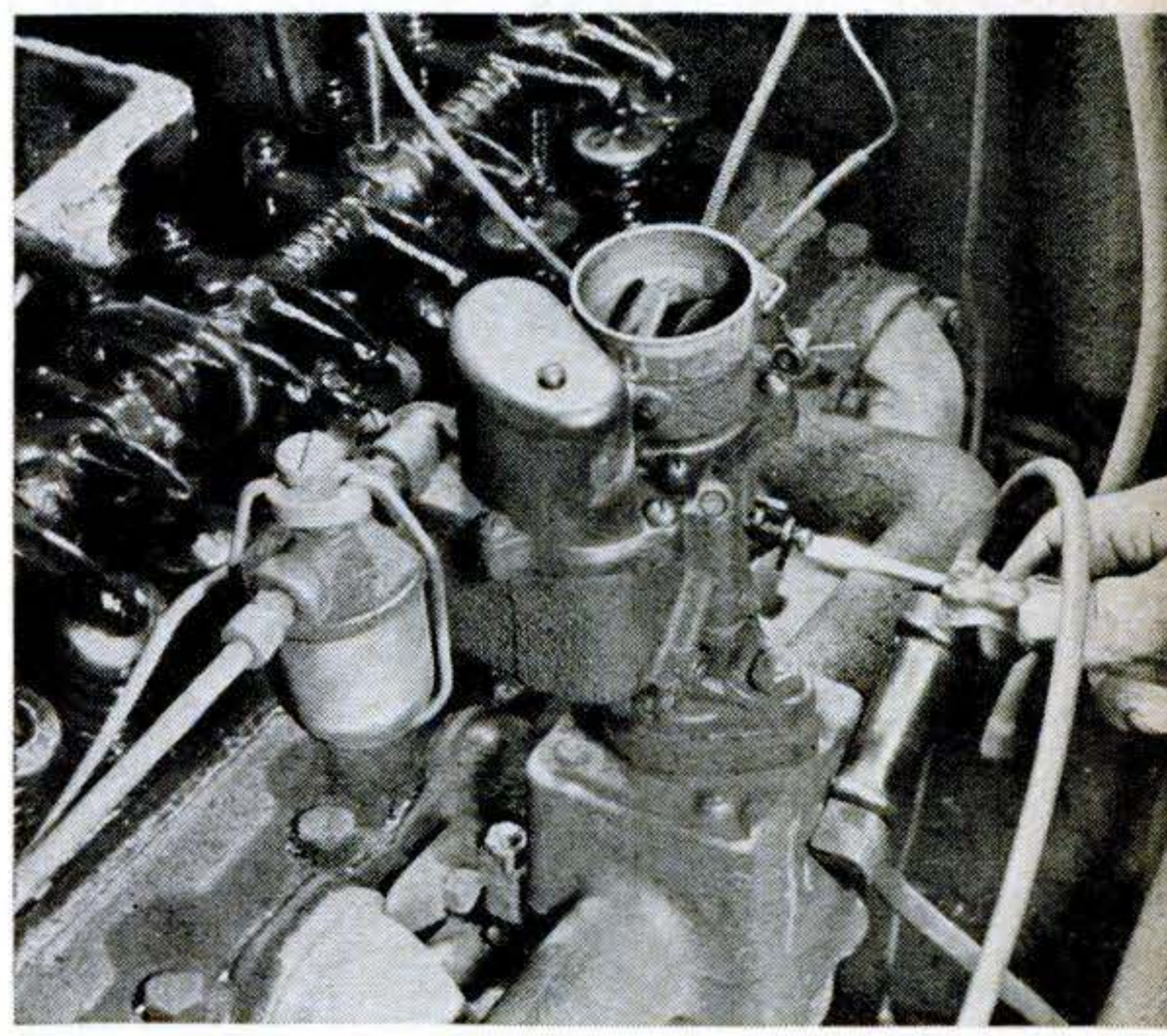
7. Ignition timing is adjusted by attaching a neon light to No. 1 plug, setting the octane selector at zero, and rotating distributor to line up flywheel mark while the engine idles.



8. Valve tappets were set at the recommended clearances with a feeler gauge and adjusting wrench as seen here. A new gasket was used when the rocker-arm cover was reinstalled.



11. Sloshed in kerosene to remove the dirt it had collected, the filter element of the air cleaner was blown dry. It then was dipped in clean oil, allowed to drain, and replaced.



12. Idle speed and mixture were both adjusted when the air cleaner was in place. (It was off here so as not to obstruct the photo). Notice hose connected to vacuum-test engine.

valve lash, fan belt, and voltage control; cleaning the air cleaner, crankcase ventilator, fuel filters, battery terminals, and spark plugs; checking the coil, condenser, distributor, vacuum spark advance, battery, automatic choke, and manifold heat control; and tightening the cylinder head, manifolds, and hose connections.

The testing equipment that's available also may extend the scope of the job. For instance, in the job presented here, the mechanic used an A. V. R. gauge to test the generator and voltage regulator (see top photo on page 168) after he had checked and cleaned the battery and terminals. In this shop the step is considered essential, for a generator output higher than the recommended maximum has a tendency to burn the points or damage the generator.

Some mechanics consider a lot of fancy equipment unnecessary, and they undoubtedly can give you an excellent tune-up job without it. But when properly maintained and honestly used, the testing equipment now seen in many shops can work to the benefit of both you and the mechanic by showing unmistakably what's needed.

At the conclusion of the tune-up illustrated here, a trained mechanic took the car out for a short road test. When he was satisfied, the job was marked okay for delivery to the customer. END

Copyrighted material

Gus Proves

Air and atoms may power cars some day, but skinflint Silas Barnstable discovers to his sorrow that the present models still need gasoline.

By Martin Bunn

STAN HICKS came into the Model Garage shop looking as if he had topped off his lunch with a glassful of vinegar. "That man," he announced, "is here again!"

Gus Wilson looked up from the valve he was grinding. "What man?" he demanded.

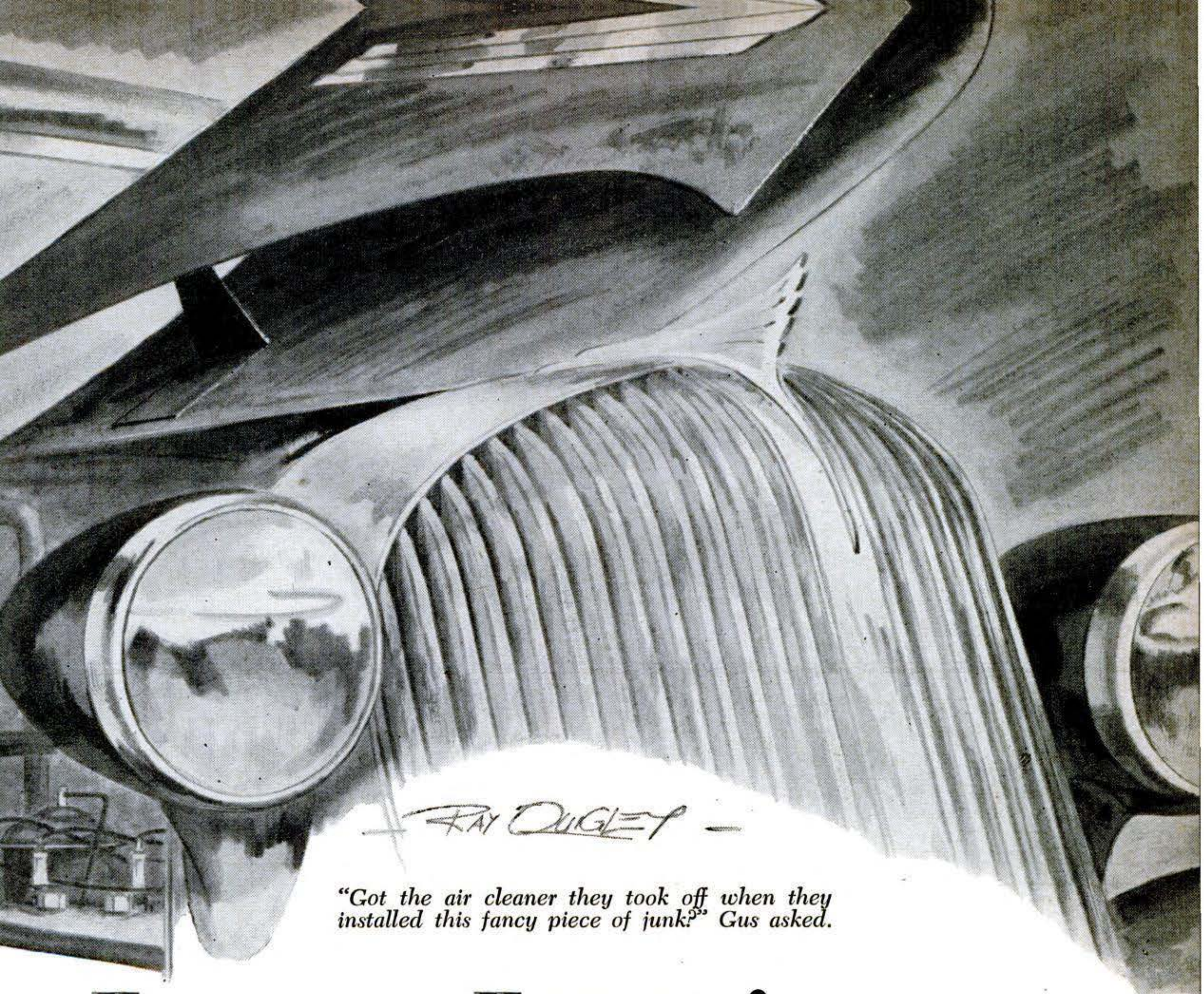
"Silas Barnstable," Stan said. "Old Mister Pinchpenny himself. He hasn't been around here for six months—not since he squawked that we were robbing him because we billed him three-fifty for a four-buck job!"

Gus grinned. For some inexplicable reason he has a tolerant liking for the old retired farmer who has—and richly deserves—the reputation of being the tightest and most cantankerous man in town. "There's one thing in Silas's favor—he's always good for a laugh," he said. "But what's he up to? Why doesn't he come in?"

Stan took a look out of the window. "He's doing something to his car," he reported. "Got the hood up, and is listening to the engine. . . . Here he comes now."

Silas strutted in. As usual his manner

Copyrighted material



"Got the air cleaner they took off when they installed this fancy piece of junk?" Gus asked.

Economy Expensive

was that of a bantam rooster challenging the world, but under it, Gus felt, he wasn't altogether at ease.

"Mornin', Gus!" he cackled. "By jimminy, I ain't seen you in a dog's age! Got a trouble-shootin' job for you—provided you be a *leetle* reasonable about what you charge for it. Old friendship's old friendship, I allus say, and I'm willing to give you another chance."

"Which means," Gus said with pretended coldness, "that you've tight-wadded yourself into a mess you want me to get you out of. Well, that's all right with me, but you'll get charged the same as anybody else—no less and no more. That being understood, what's the matter with your car?"

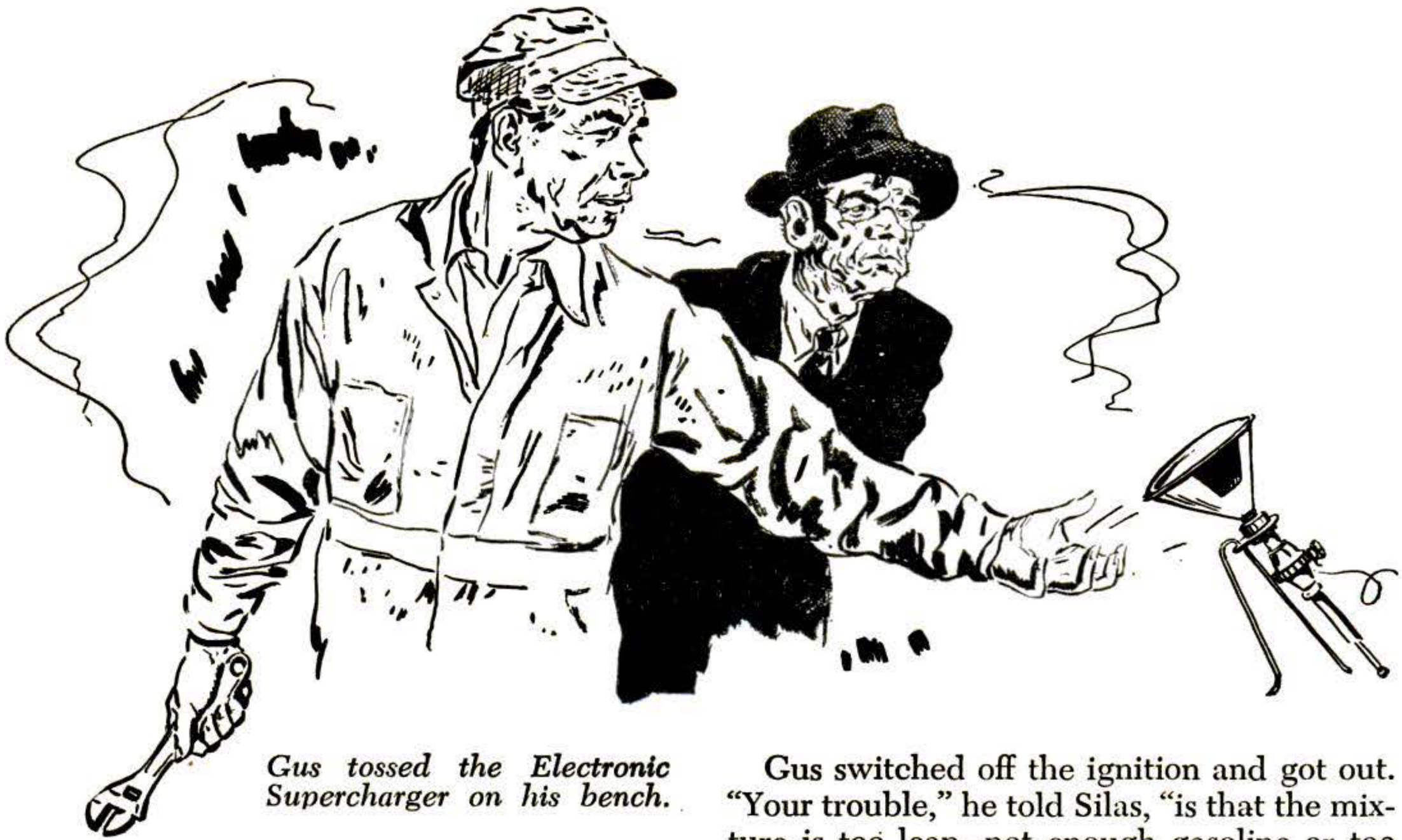
"Derned if I know what's the matter with it," Silas grumbled. "It don't run the way it ought to, that's all I know. But it can't be anything serious—nothing that ought to cost much to fix."

"There's one way to find out. Drive it in." Silas drove his car into the shop and got out, leaving its engine idling—which it did with considerable missing. "Now jest listen to that," he complained. "She starts harder'n cold molasses and then does a lot of coughin' and sputterin'."

"Maybe it's the cut-rate gas you get down at that joint you do business with," Stan suggested.

Silas glared at him. Then he turned back to Gus. "I thought maybe you would have made some improvements around here since

Copyrighted material



Gus tossed the Electronic Supercharger on his bench.

the last time I was in," he said. "Such as firin' that nitwit grease monkey, for instance. . . . There's nothing the matter with this gas I've got in today—I bought it at that big service station across from the Post Office, and they charged me plenty for it."

"Well," Gus decided, "if there isn't something screwy with your ignition, the engine is being starved for fuel, and since you're using decent gas for a change, the fuel line must be partly clogged, or the carburetor is out of adjustment. I'll check—"

"No you don't!" Silas howled. "You ain't going to waste time monkeying around with the ignition or the gas line or the carburetor. Not if I've got to pay for it! They've all been gone over by a good mechanic, and he didn't find anything wrong!"

Gus gave him a straight look. "I'll do this job my way or not at all," he said tartly. "Take your choice!"

Stan's snicker didn't make it any easier for Silas to give in, but after half a minute of grumbling he told Gus to go ahead "your own fool way."

GRINNING, Gus got into the car and pressed his foot down on the accelerator pedal. As the engine speeded up the missing got worse, and it began to cough and backfire in the carburetor.

He pulled the choke part way out. The missing and backfiring stopped, and when he eased the engine back to idling speed it continued to run smoothly.

Gus switched off the ignition and got out. "Your trouble," he told Silas, "is that the mixture is too lean—not enough gasoline or too much air. You haven't been fooling with your carburetor, have you?"

"Never even tetched it!" Silas disclaimed.

"If you haven't changed the carburetor adjustment," Gus grunted doubtfully, "the needle-valve or the float must have got out of kilter. Or maybe there's an air leak in the intake manifold."

Gus raised the hood. He leaned over to examine the carburetor, but immediately straightened up with an expression of deep disgust on his face. "What the dickens is *that?*" he demanded, pointing to an oddly-shaped tin can where the air cleaner should have been.

"Newest thing out!" the owner said proudly. "Feller that sold it to me called it the Save-Gas Electronic Supercharger. It's a fuel economizer, that's what it is. And it's cut down my fuel bills, by heck! Not as much as the feller claimed it would, but enough so it'll soon have paid for itself. After that it'll be a real money saver for me. I got a leetle laid by for a rainy day, but I ain't one to waste when I can save!"

"I'll say you're not!" Gus agreed with real feeling. "How long have you had this do-funny on your car?"

" 'Bout a month," Silas told him.

"And how long has your engine been missing and coughing, and starting hard?"

"Well," Silas admitted slowly, " 'bout the same length of time, I guess."

"For a man with your head for figures, you add things up awful slow," Gus said,

Copyrighted material

tapping the fuel economizer not too gently with a wrench. "That's the cause of your trouble, and I'll prove it to you. . . . Got the air cleaner they took off when they installed this fancy piece of junk?"

"Yep—it's in the back of the car."

Gus disconnected the Save-Gas Electronic Supercharger, and tossed it contemptuously on his workbench. Then he reinstalled the air cleaner. "Now listen," he said, and got into the car.

The engine took off at a mere touch of the starter switch. When he stepped on the accelerator it speeded up smoothly, without missing or backfiring, and with the choke in. When he eased the pressure on the pedal it idled quietly and steadily.

Gus got out. "Convinced?" he asked.

The old fellow was red in the face and his faded blue eyes were blazing. "I've been cheated!" he howled. "If they won't give me my money back for that danged contraption I'll stand 'em a suit—I will, by heck!"

"You've been stuck, all right," Gus agreed unsympathetically, "but you can't do anything about it. You've got to admit that the Save-Gas Electronic Supercharger—which isn't either electronic or a supercharger—did just what the salesman claimed it would do. It reduced the amount of gas you used." He picked up the funnel-like contrivance, looked it over carefully, and handed it to Silas.

"You see how it saves gas, don't you? The opening of the can is toward the front of the car, so extra air flows into the carburetor. That leans the fuel mixture, and saves gas—just what the salesman said—so you can't claim that he misrepresented it. He just forgot to mention what the saving would cost in terms of performance."

"I'll get even," Silas snarled. "Those dirty cheats not only stuck me with this thing—they charged me for a trouble-shootin' job! If they don't make good I'll have the law on 'em!"

AFTER Silas had gone on his way, still breathing fire and vowing vengeance, Stan turned to Gus. "Say, boss," he asked, "are all the fuel economizers as useless as that one old Pinchpenny got stuck with?"

"I wouldn't want to say that," Gus hedged, "because maybe I haven't seen them all. But I will say that I've never seen one that would do anything a simple carburetor adjustment wouldn't do as well or better. And the engineers at the Bureau of Standards down in Washington, who have tested a lot of 'em, say the same thing.

"Mind you, I'm only speaking of economizers, not performance improvers of the hot-rod, short-manifold type. These can sometimes make a sluggish engine wake up, while gas savers do just the opposite.

"This economizer is one of the better ones," he went on after he had fired up his pipe. "At least it makes good on its promise to reduce gas consumption. But unless the buyer's carburetor has been adjusted to give too rich a mixture, it does it by cutting engine performance.

"Most gas-saving gadgets work on the principle of adding more air to the carburetor mixture. If the carburetor has been set to give an unnecessarily rich mixture, an economizer will cut fuel consumption without spoiling engine performance by leaning down the too-rich mixture to normal. But carburetor adjustment will do that just as well, and cheaper. If the carburetor gives a normal mixture, an economizer will still reduce gas consumption, but the extra air makes the mixture so lean the engine'll buck and cough. If you don't mind poor pick-up and a little sluggishness, you can save just as much gas by installing a 'lean' jet on the carburetor."

"And go limping off at every light? Not me!" declared Stan.

"The average car owner, who's more interested in good performance than in squeezing the last possible foot out of each gallon of gas," said Gus, "should stick to normal carburetor adjustment. That'll feed a rich mixture when needed to give maximum power, and a leaner mixture when the engine doesn't work so hard.

"Most fuel economizers work on the air-adding principle, but a few have been developed which try to do the fuel-saving job in a different way. They don't spoil performance, but they don't save gas either. One that I had a chance to look at used an electric spark. It was supposed to make ozone to boost power, but the amount of ozone it produced was so small it couldn't be measured—which was lucky because ozone in quantity is a swell knock inducer!"

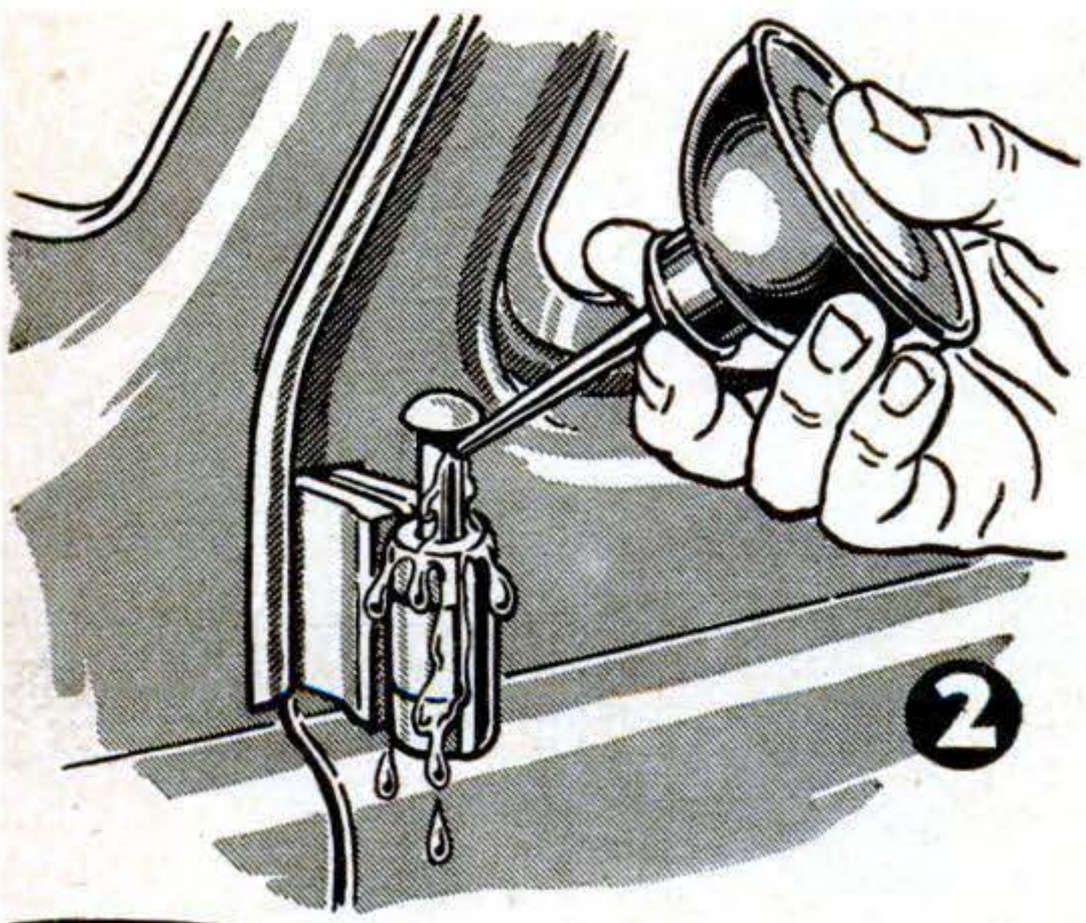
Stan nodded thoughtfully. "I guess it all boils down to this—you get what you pay for."

Gus stared at his assistant with mock surprise. "Once in a long while," he said, "you amaze me by being sensbile!" END

Copyrighted material

Hints From the

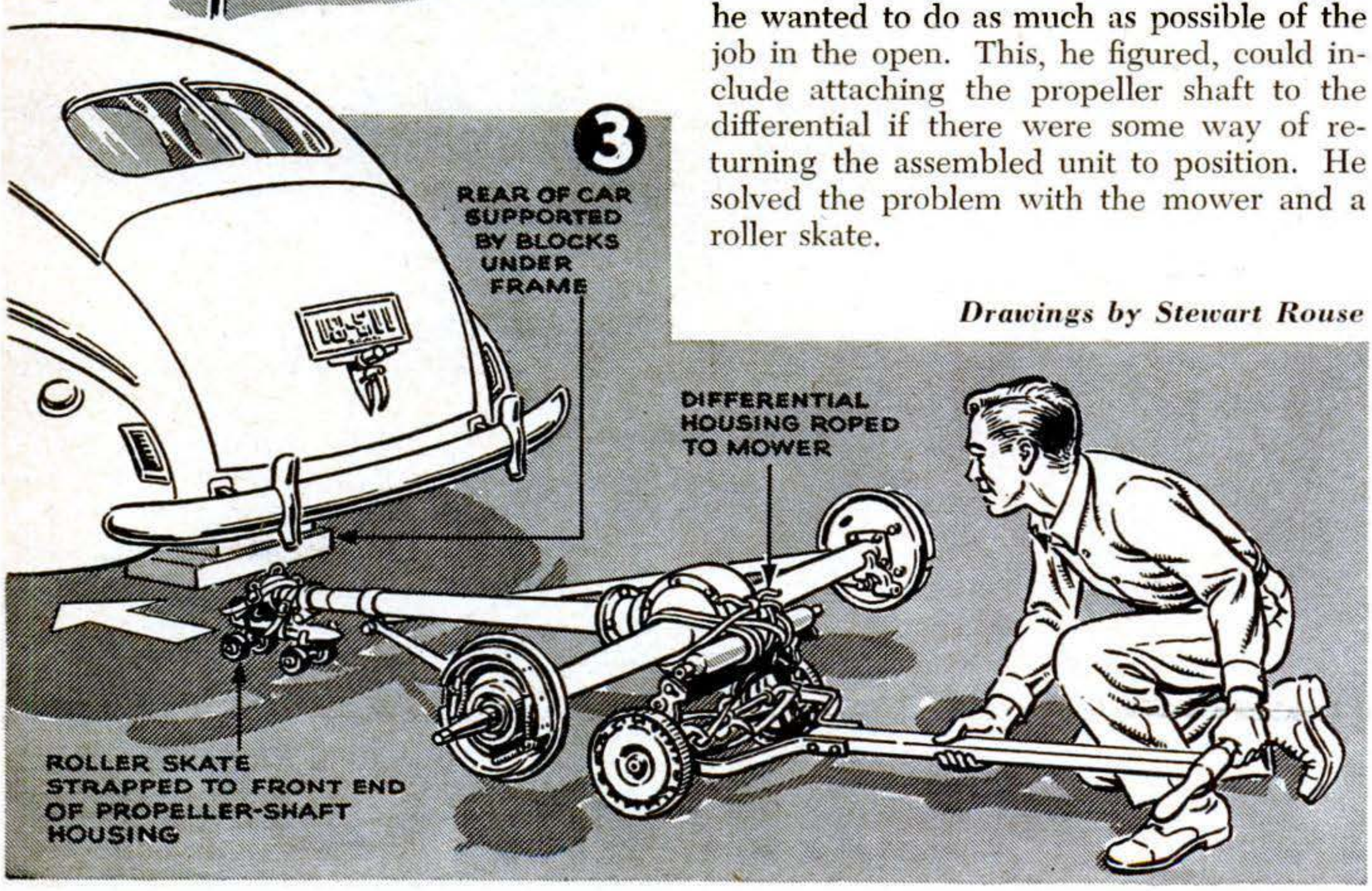
1. A flashlight is handy for repairs at night, but it may force you to work with one hand. A chap who stopped in the Model Garage had solved the problem neatly by keeping a heavy rubber band on the light. With this, he can strap the light to his forearm, freeing both hands for work. He also keeps a supply of tape wrapped around the light—so he needn't hunt for it in the dark.



2. Drive Out Hinge-pin to Oil. In the older cars with exposed hinges, Marion L. Rhodes, of Knightstown, Ind., finds it's best to drive the pin out halfway when oiling. Then apply a penetrating oil and allow to soak about five minutes. Unless the pin is loosened, even excessive oiling may not stop a persistent squeak.

3. Mower Used as Dolly. While doing a rear-end job in his backyard, G. A. Miller, Jr., of Atherton, Calif., found an unexpected use for his lawn mower. Since there was little room to work under the car, he wanted to do as much as possible of the job in the open. This, he figured, could include attaching the propeller shaft to the differential if there were some way of returning the assembled unit to position. He solved the problem with the mower and a roller skate.

Drawings by Stewart Rouse



Copyrighted material

Model Garage

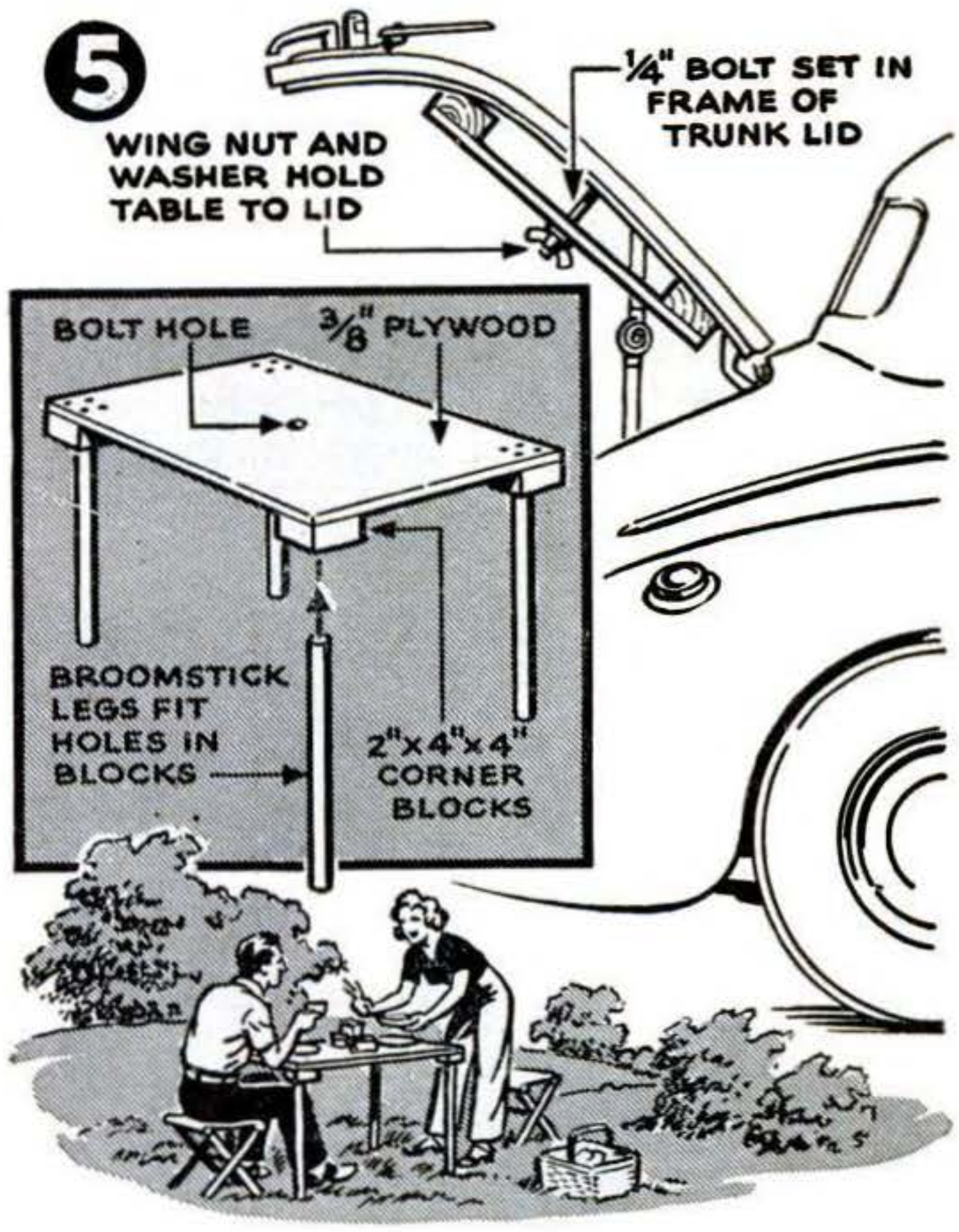
4. Paint the Hood Inside. Heat from the sun and engine may cause the finish on the hood to deteriorate. As a precaution, W. Van Sandt, of Long Branch, N. J., recommends making use of the fact that light colors reflect heat. White enamel or silver paint applied inside the hood will reflect part of the engine heat and keep the hood cooler.

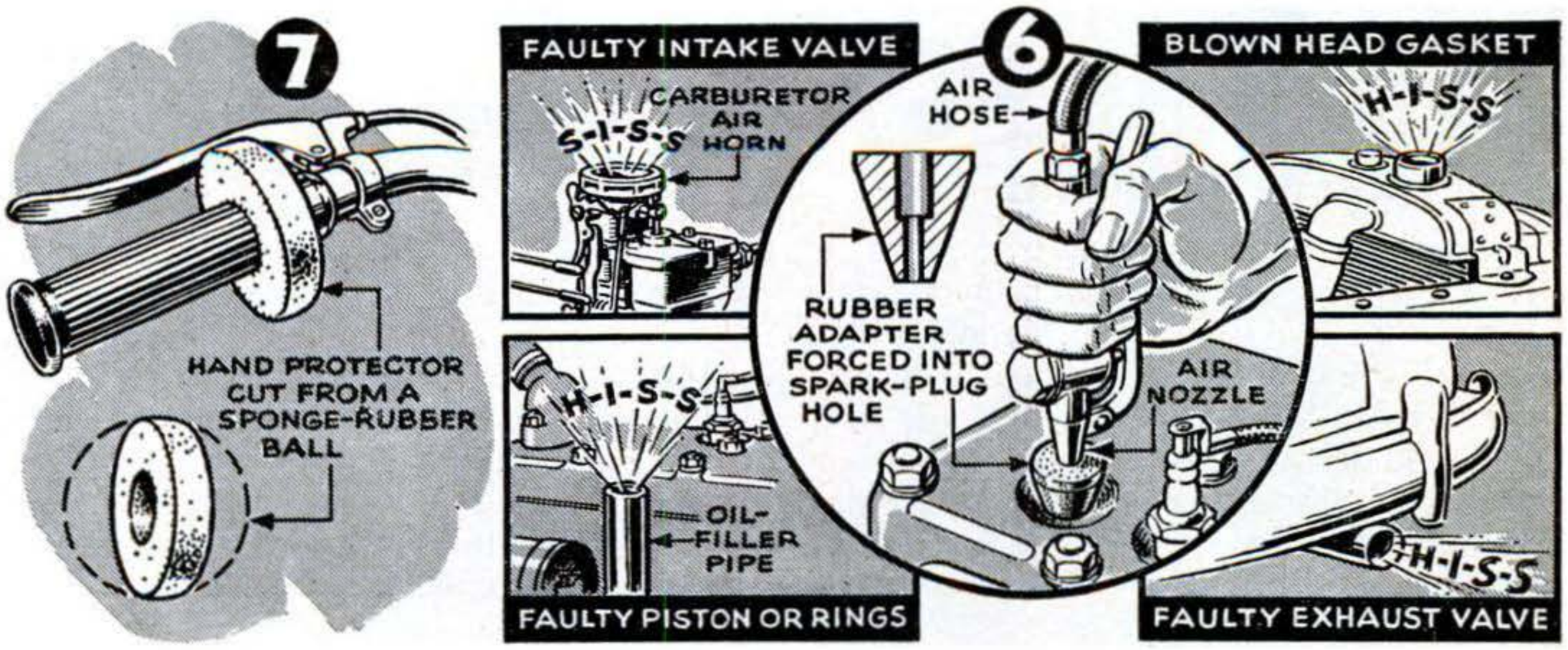
5. Table Always With You. Now that picnic time is here again, you may want to follow in the footsteps of H. C. Marhoff, of Chicago, and build this convenient table. When not in use, it takes up little space.

6. Air Spots Compression Leak. When an engine loses compression on one cylinder, Robert Brunt, of Lakewood, Ohio, diagnoses the trouble with an air hose. After removing the plug and setting the piston on firing position, he applies air to the spark-plug hole. If air hisses from the carburetor air intake, the trouble's in the intake valve; if from the exhaust pipe, in the exhaust valve; if from the oil filler, it's the piston or rings; if from the radiator, a blown gasket.

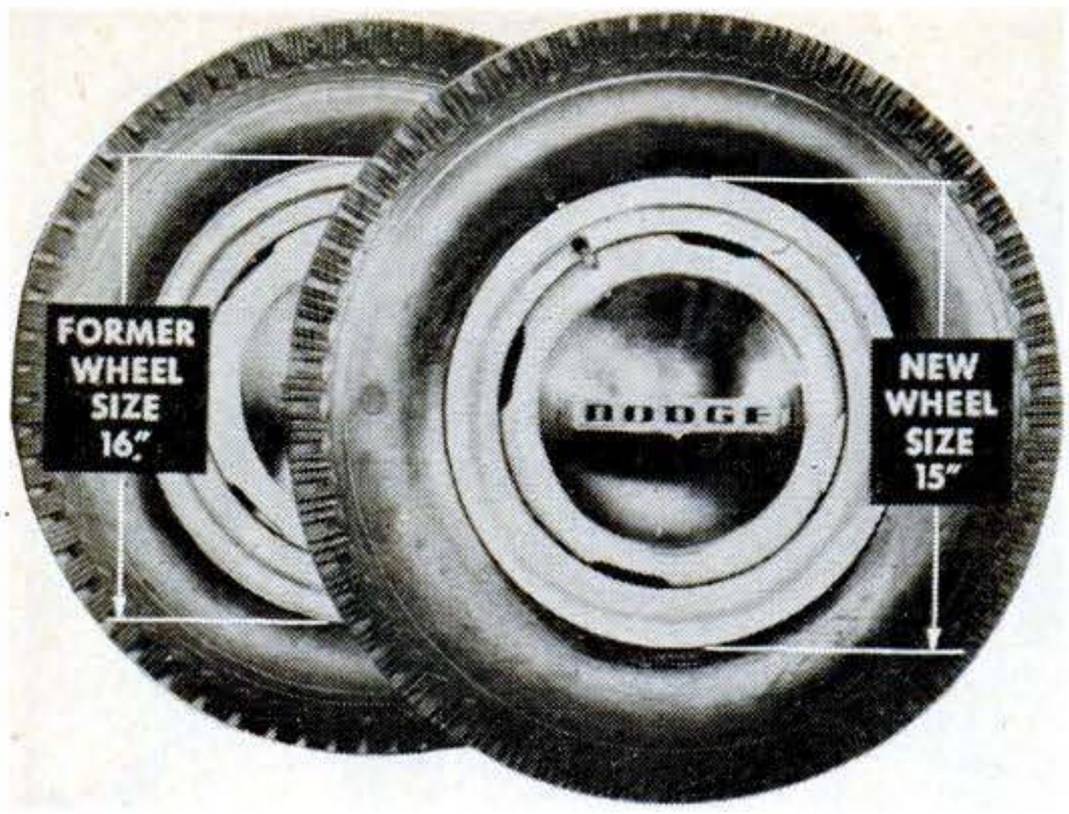
7. Cushions Rider's Hand. On long runs, the front-brake lever may chafe a motorcyclist's hand. A sponge-rubber disk slipped over the grip will prevent this.

Gus Wilson





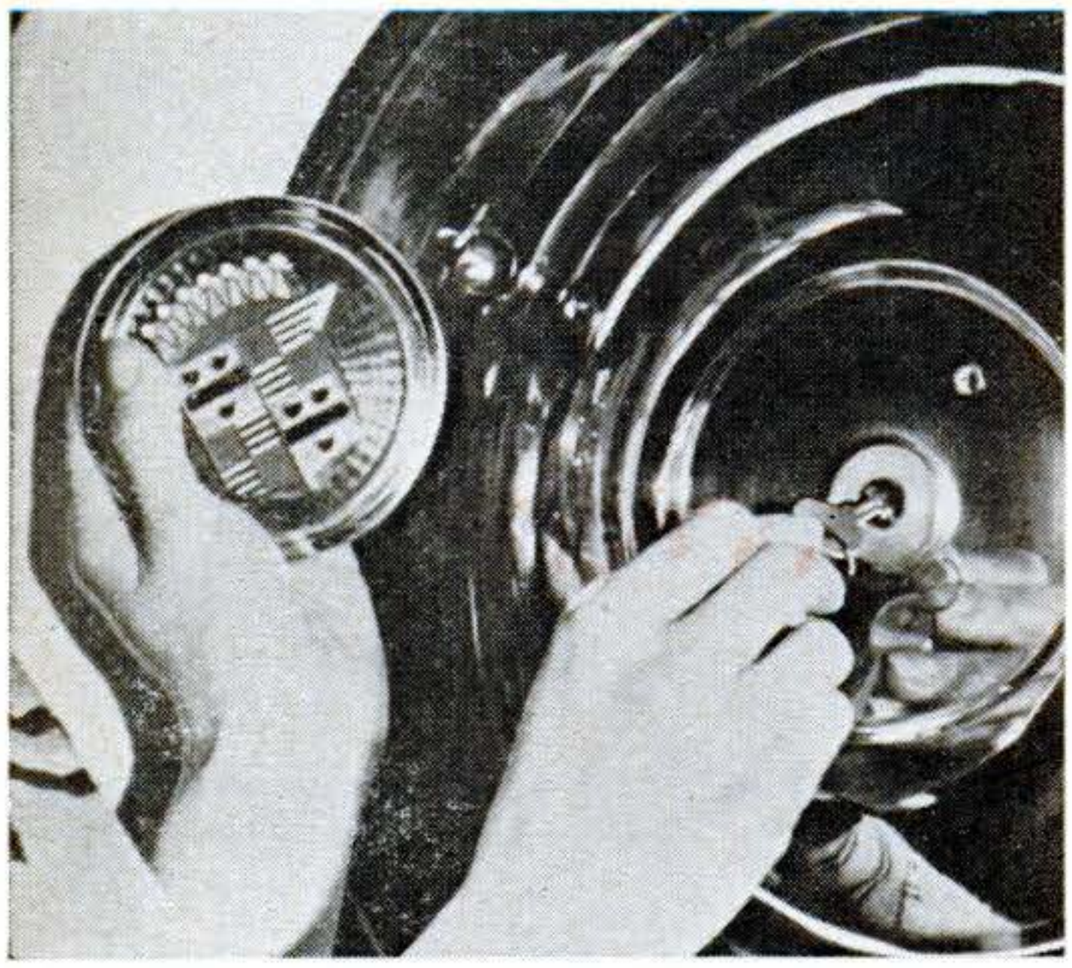
Copyrighted material



Rims Changed for New Tires

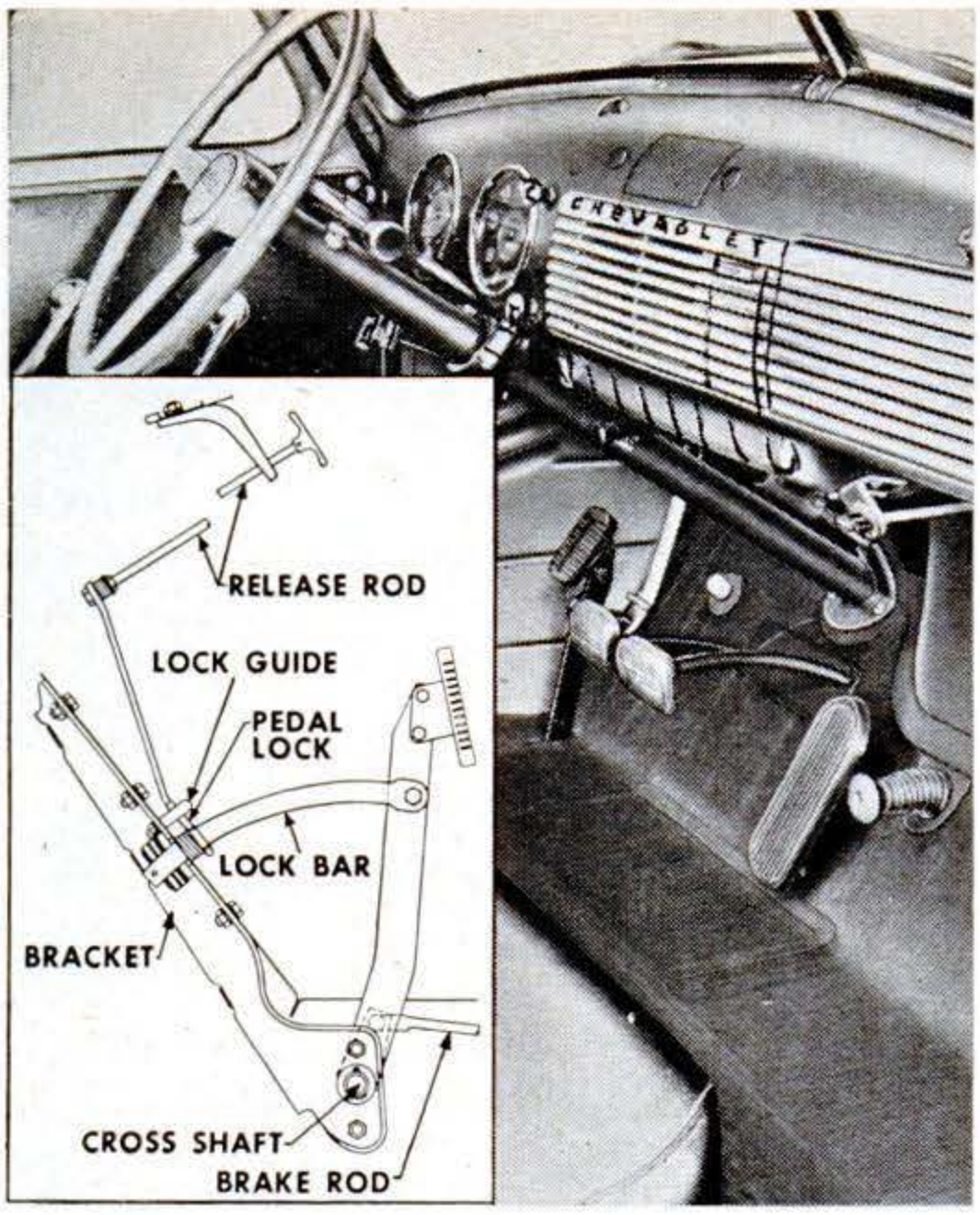
LOW-PRESSURE tires 7.10" by 15" have been made standard equipment this year on all Dodge passenger cars, and rim dimensions have been changed to suit—a reduction of 1" to a diam ter of 15" and an increase of 1" to a width of 5".

Larger tires carrying greater air volume at lower pressure likewise are now being used on several other makes of cars. A softer and more comfortable ride, better road grip, and cooler running are among their advantages. Inflated pressure is 24 lb.



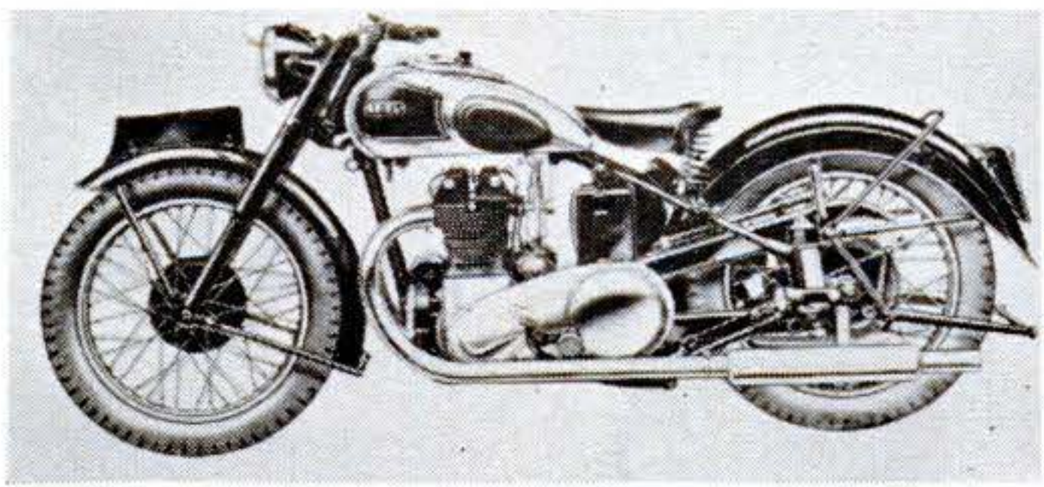
Lock Guards Your Hub Cap

CONCEALED by a decorative emblem, a lock in this new disk hub cap protects both the cap and wheel from theft. Made of stainless steel, the cap can be installed with just a tire wrench. At present it is available only for late models of three makes of cars, but the manufacturer—the Factory Tool Supply Company, of Beverly Hills, Calif.—has scheduled production for other makes. It's called "Lok-All®."



Parking Brake Applied by Foot

CHEVROLET has introduced a foot-operated parking brake on its 1948 light-duty trucks. Applied by depressing the pedal at the far left of the cab, the brake is released by pulling a hand rod mounted below the instrument panel. On all truck models with payloads up to 2,100 lb., the gearshift also is now located on the steering column rather than on the floor. Greater safety and operating ease are claims.



Ariel Introduces Twin Cycle

HERE is a new overhead-valve, vertical-twin motorcycle just announced by Ariel Motors, Ltd., of Birmingham, England. Hitherto Ariel has been known chiefly for its unique Square Four engine (PS, Aug. '47, p. 140).

The engine of the new twin has a capacity of 500 cc. (30.50 cu. in.) and a compression ratio of 6.8 to 1. Features include a one-piece crankshaft, four-speed transmission, and telescopic front forks. Equipped weight is about 415 lb.

Copyrighted material

Mechanics and Handicraft

REG. U. S. PAT. OFF.

Wall Rack for Spoons PAGE 181

Marine Bookcase Made of Pine PAGE 184

Put Midget Snap Switches to Work PAGE 192

How Cape Codders Build a Skiff PAGE 200

Sealing a Finish in Wood PAGE 230

Nice work, and you can do it. A spoon rack takes little material, may become an heirloom. Page 181.

Turned Plastic Cigarette Holders

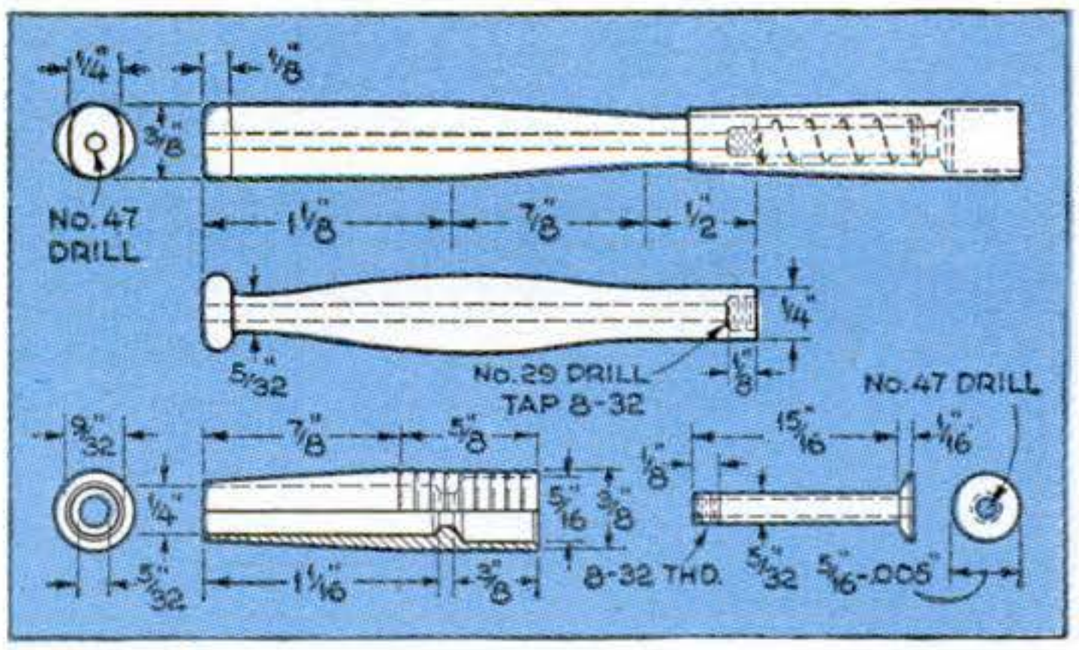
FOR pure relaxation, my favorite pastimes are smoking and simple lathe projects. What could be more natural than using one in the service of the other? Putting one and one together added up to these two plastic-and-metal cigarette holders. At the right is an ejector type; the one below is plain.

Aluminum is the best choice for the metal portion, while the plastic tip can be made of any clear or opaque stock large enough to form the blank. I think clear plastic looks a bit nicer, but it will show up mistakes in drilling the stem and the bore tends to discolor from the smoke. A pipe cleaner dipped in alcohol, however, cleans it quickly.

Centerdrill a ⅜″ by 2½″ plastic cylinder, (this applies to either type) then chuck a No. 47 drill in the lathe, and feed the blank into it with the tailstock. Go half way and repeat from the other side. Back it out frequently and clear off chips to keep them from scoring.

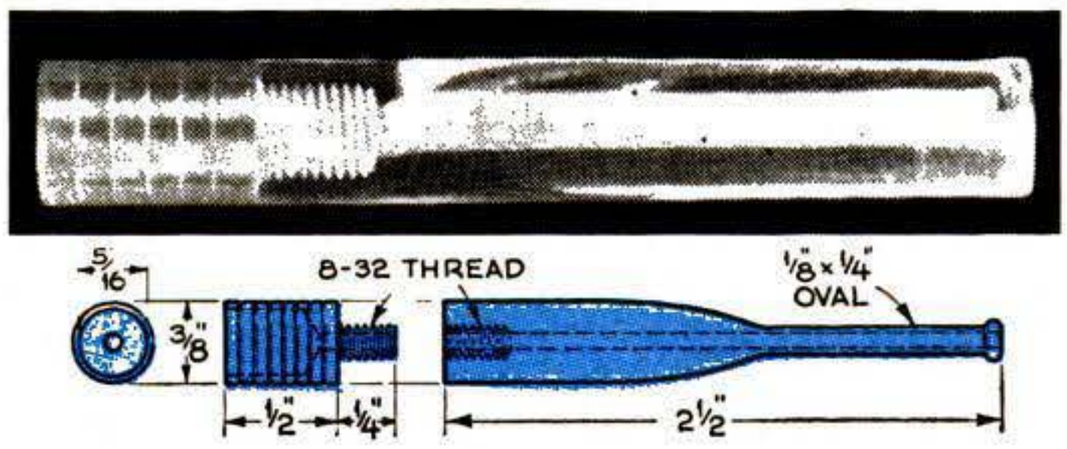
You can shape the oval mouthpiece quickest on a grinder. Take off the excess plastic until you are fairly near the final shape. From here on file it carefully, remove file marks with several grades of abrasive paper, and finish by buffing.

In making the ejector holder, take pains to get a sliding fit without shake between the mouthpiece and the ¼″ hole. The ejector

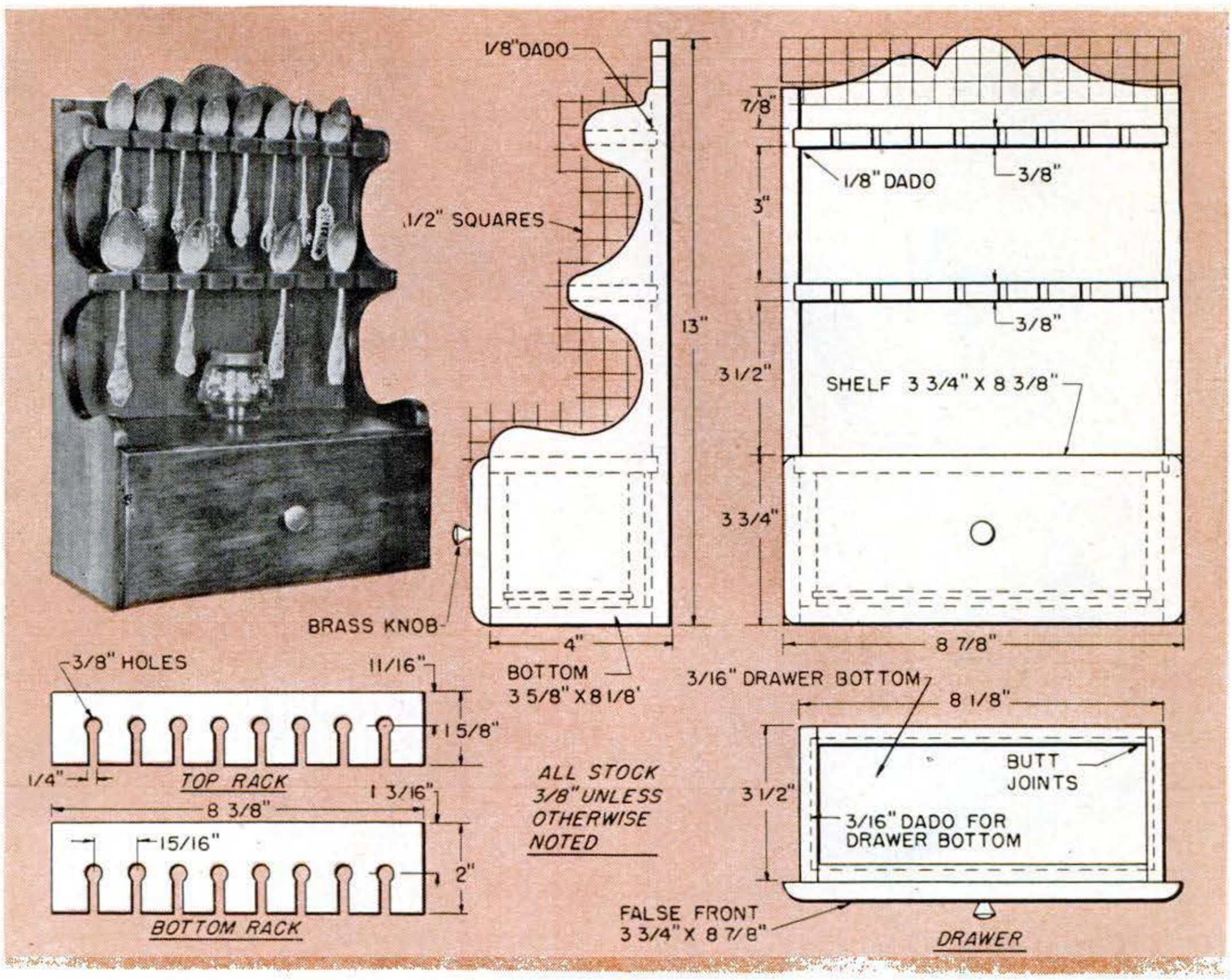


flange itself should be a nice sliding fit in the 5/16″ diameter. Too tight a fit will interfere with the ejecting action, and too loose a one will dilute your smoke with air. In turning and drilling the outer piece, it's more convenient to make it with the tapered end toward the tailstock.

If you don't mind pushing the holder forward by hand, you can dispense with the spring.—*Joseph F. Gréce, New York.*



Copyrighted material



Cherry Rack Sets Off Your Spoons

ANY collection of silver spoons should be seen to be appreciated—not hidden away. Here's a neat little holder in which you may hang yours for display. The generous drawer at the bottom will take any extras.

Cherry was used to make it. The dark, rich finish usually given this wood is an effective background for the gleaming silver. However, it probably would be equally attractive in pine with an antique finish.

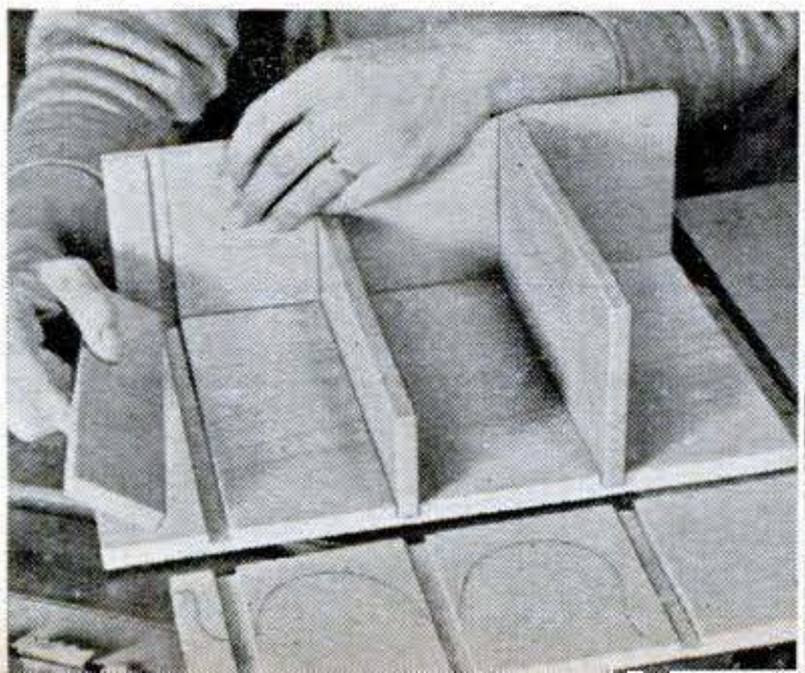
Except for the 3/16″ drawer bottom, ⅜″ stock was used throughout. All the pieces—sides, back, bottom, racks, and shelf—were first cut to the indicated rectangular dimensions. Before the back and sides were sawed to the given patterns, ⅛″ dadoes were cut in them to receive the ⅜″ thickness of the racks and shelf. The bottom is butted within the sides and back.

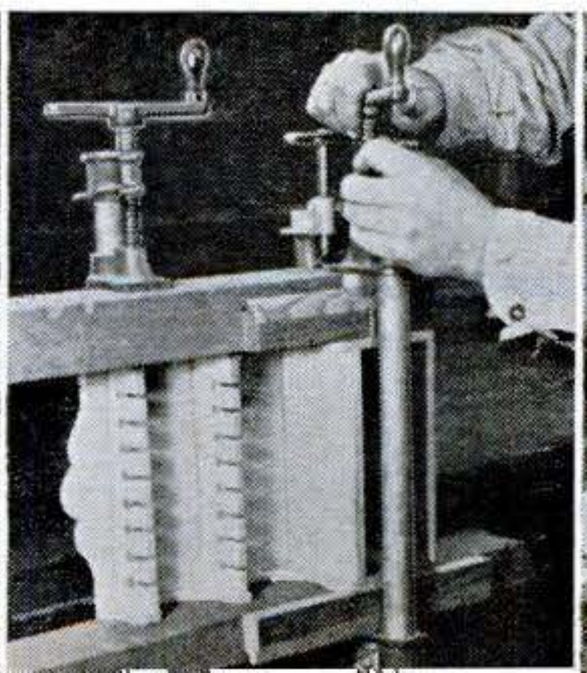
Slots for the spoons are easily formed in the two racks by first drilling equally spaced ⅜″ holes and then sawing ¼″ slots to them. Notice that the bottom rack is wider so that the upper spoons will hang in a different plane from those below.

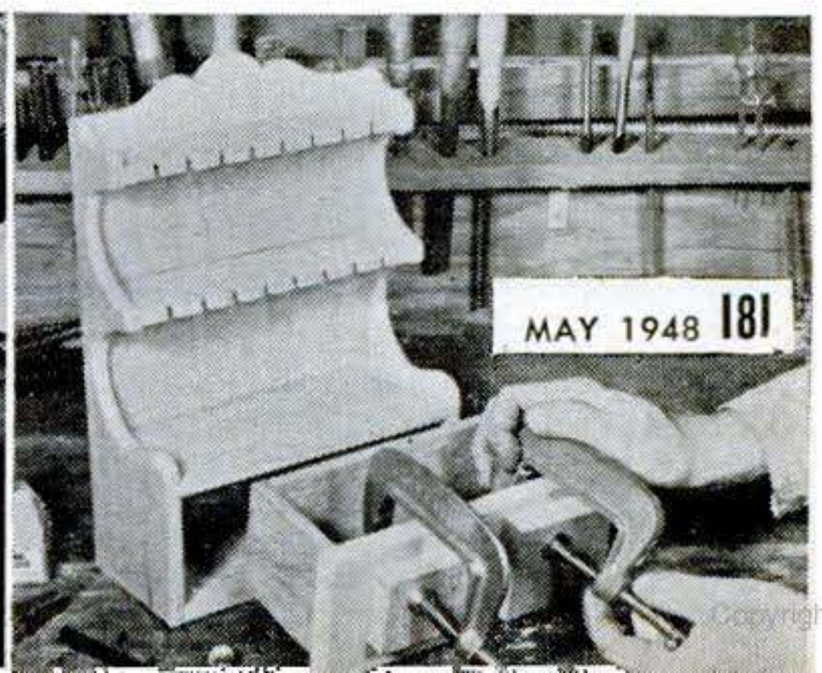
The drawer requires little time. Use butt joints for the corners, but cut a 3/16″ dado for the bottom. Glue on a false front and install a small brass knob as a drawer pull.—*Doris Aller, San Francisco, Calif.*

Cut dadoes in the back and sides after sawing all the pieces to rectangular dimensions. Here the pattern has been laid out on one side.

Clamp all the parts securely while the glue is drying. Sand them well before assembly. The edges may be rounded off as desired later.

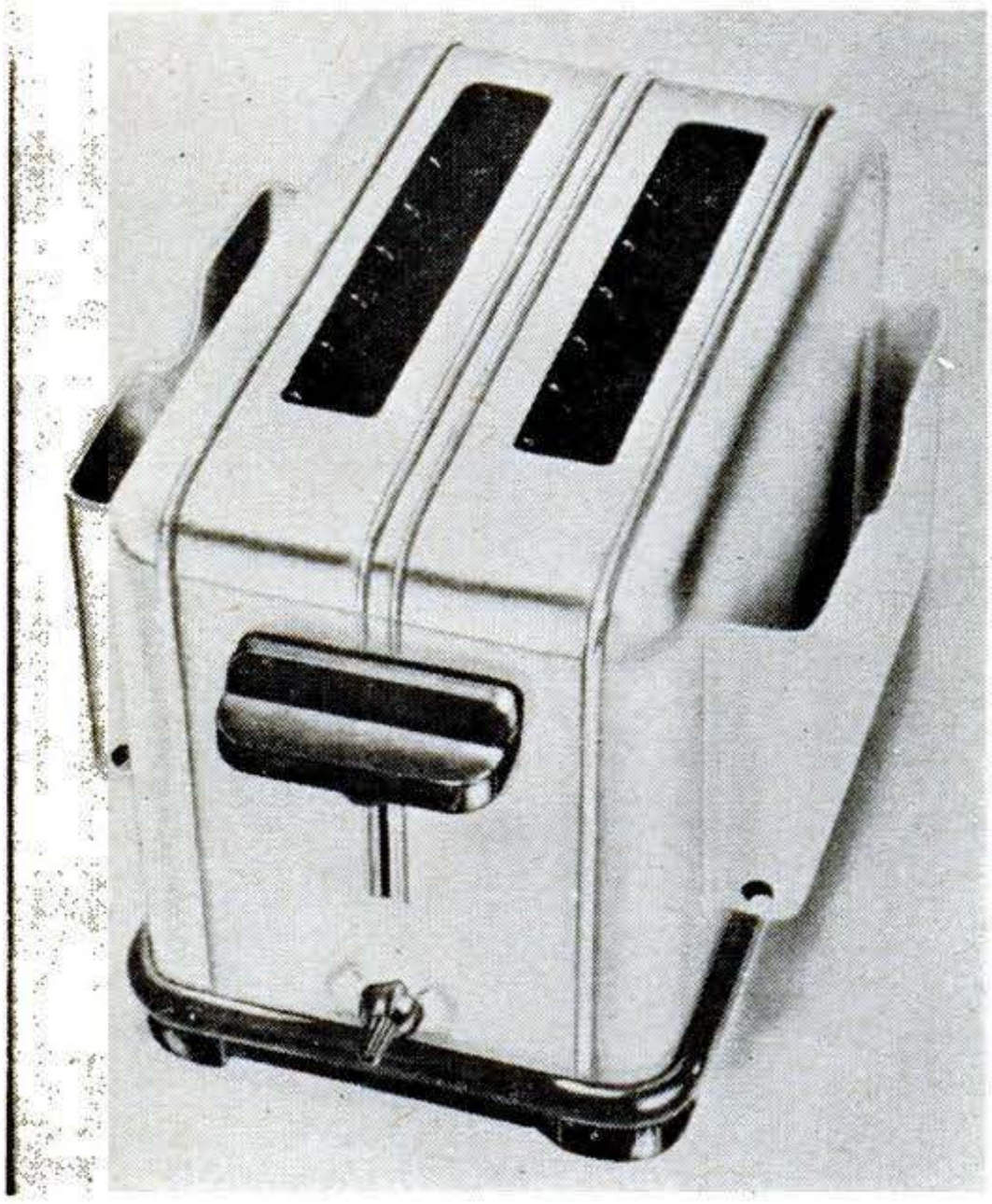






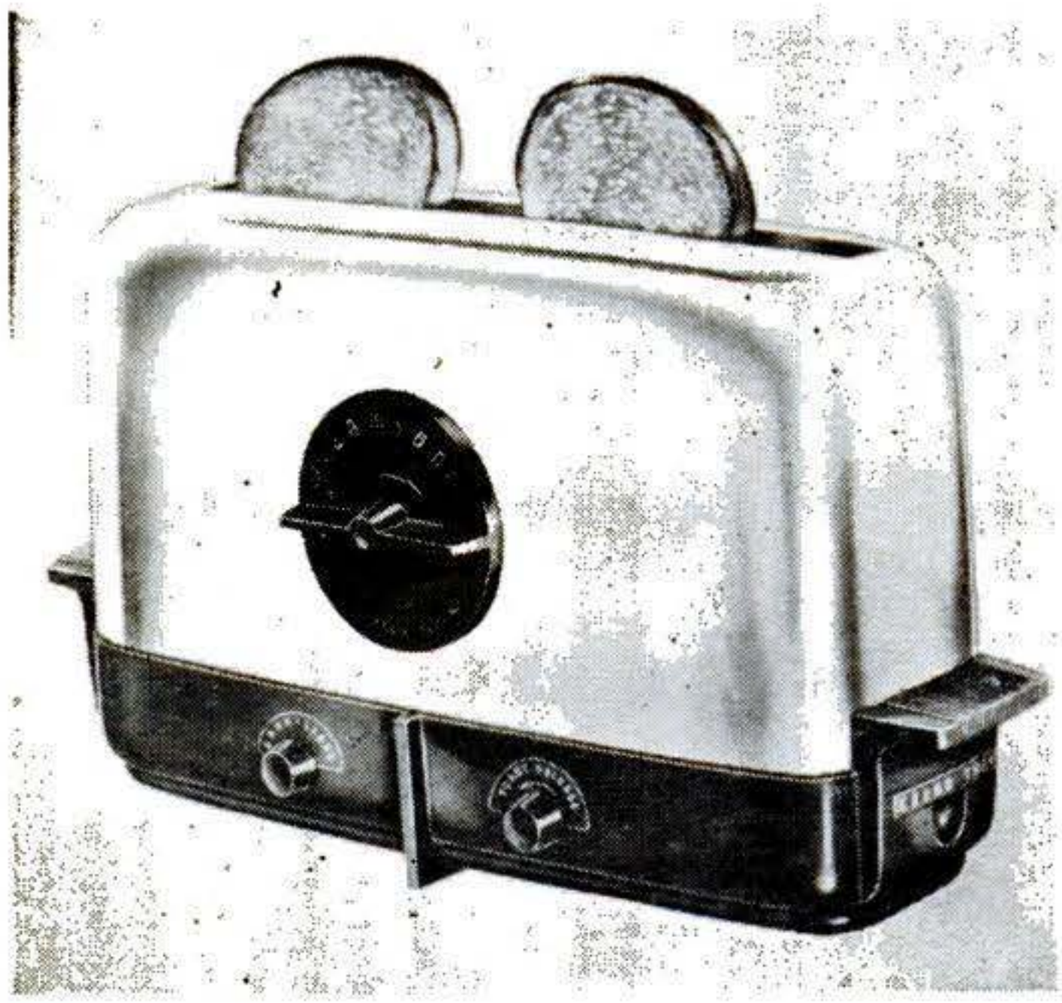
Copyrighted material

AIDS TO MODERN LIVING



New Toasters. Placed in the side pockets of the toaster above, your first two pieces of toast will be kept warm while two more are timed to a turn and popped up when ready. The pockets are the idea of Paul H. Wilkinson, Flushing, N. Y.

Designed for crowded tables or even window sills, the other automatic toaster below has a single slot that takes two slices edge to edge. A slide-out tray catches all crumbs. It's made by Samson United Corp., of Rochester, N. Y.



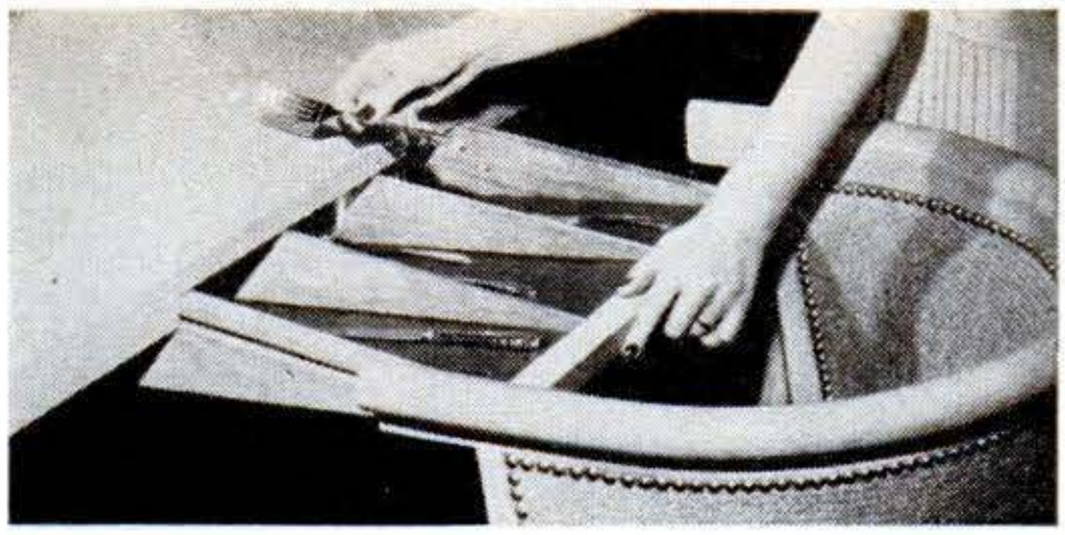
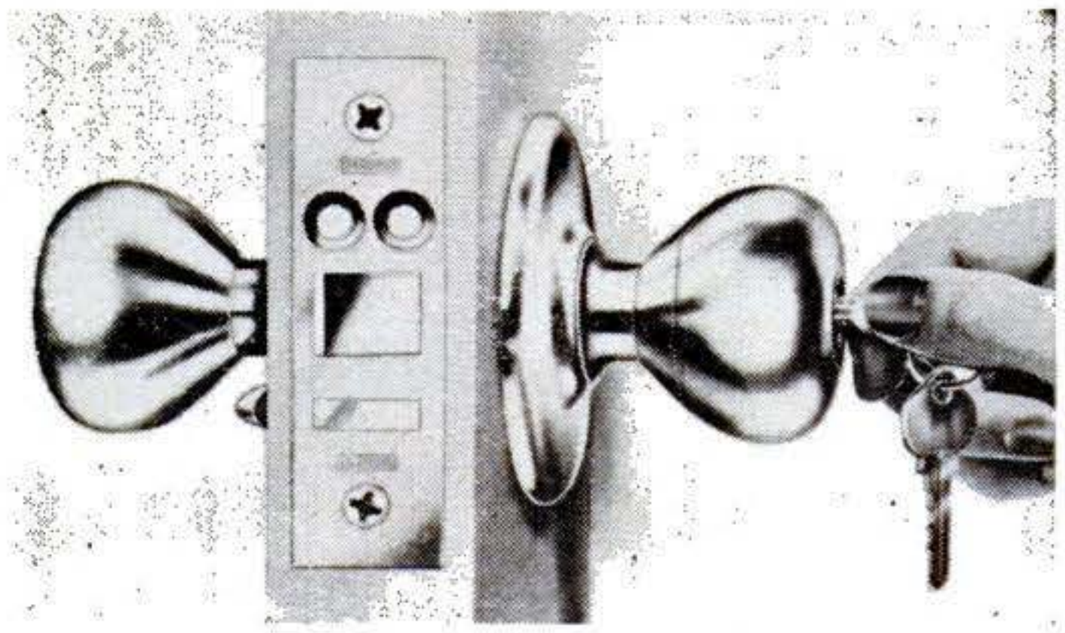
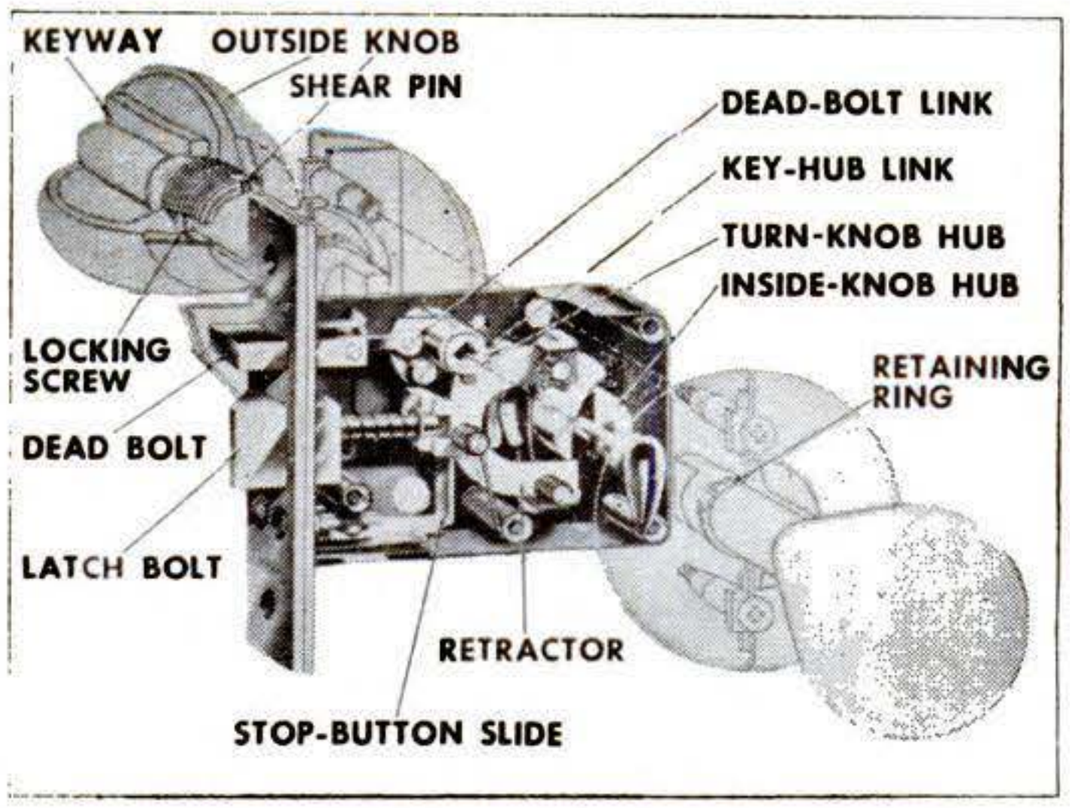


Table Drawer Slants. In a modern dining table produced by the Romweber Company, of Chicago, a special drawer for silver slants inward to make sitting at the table more comfortable. Closed, the drawer fits flush into the edge of the table.



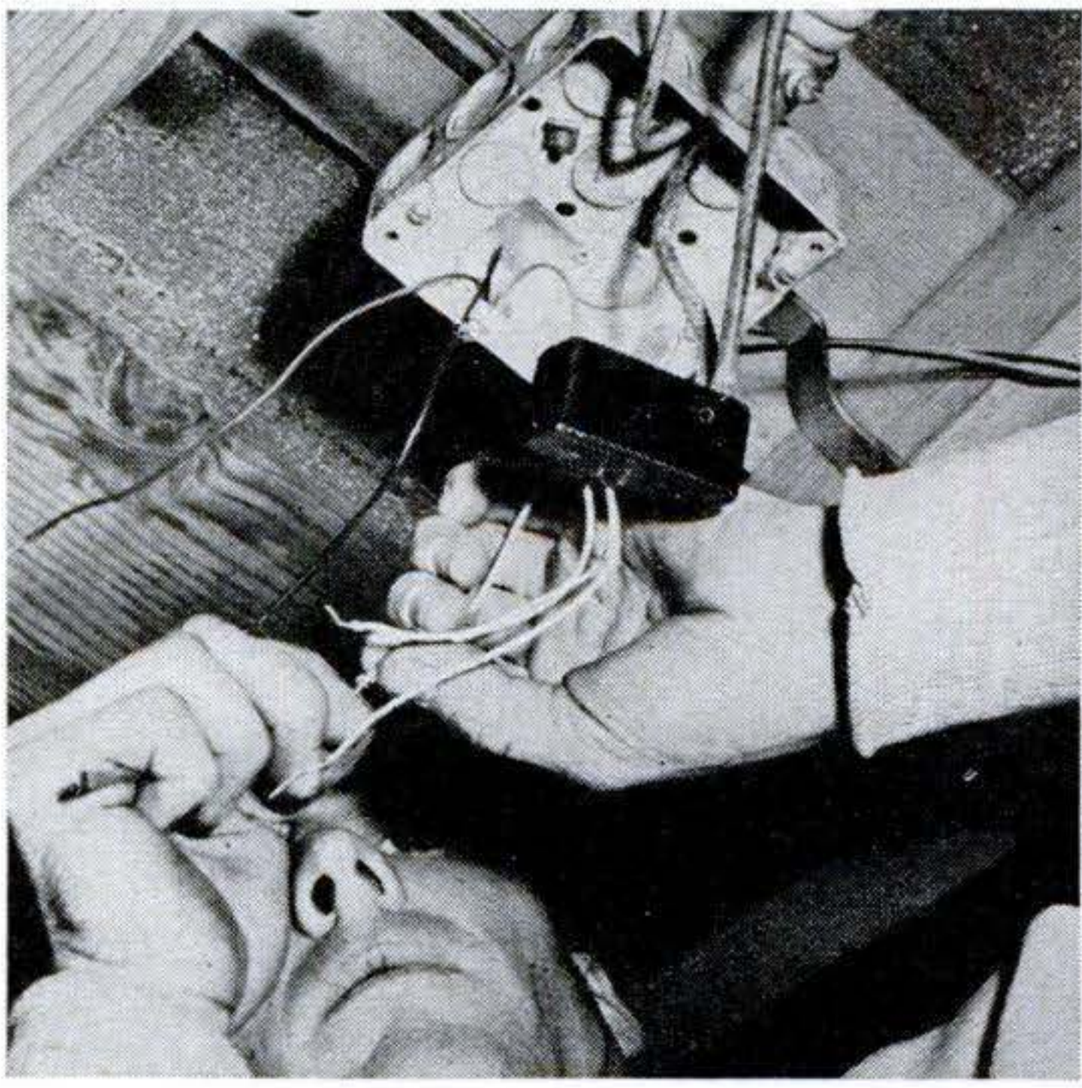


Lock in Doorknob. Designed for the outer doors of small homes, this new lock operates with just a quarter turn of the key, releasing both the latch and dead bolt. A shear pin provides protection against forced entry. If subjected to extreme torsion, the pin gives way, allowing the knob to spin harmlessly, yet the regular key will open the lock. Inside, the dead bolt may be actuated by a turn lever. Sargent & Co., New Haven, Conn., manufactures the lock in a variety of finishes. A complete unit is priced at $18. The drawing above shows some of the operating parts, all of which are mass produced to close tolerances to allow for easy replacement.

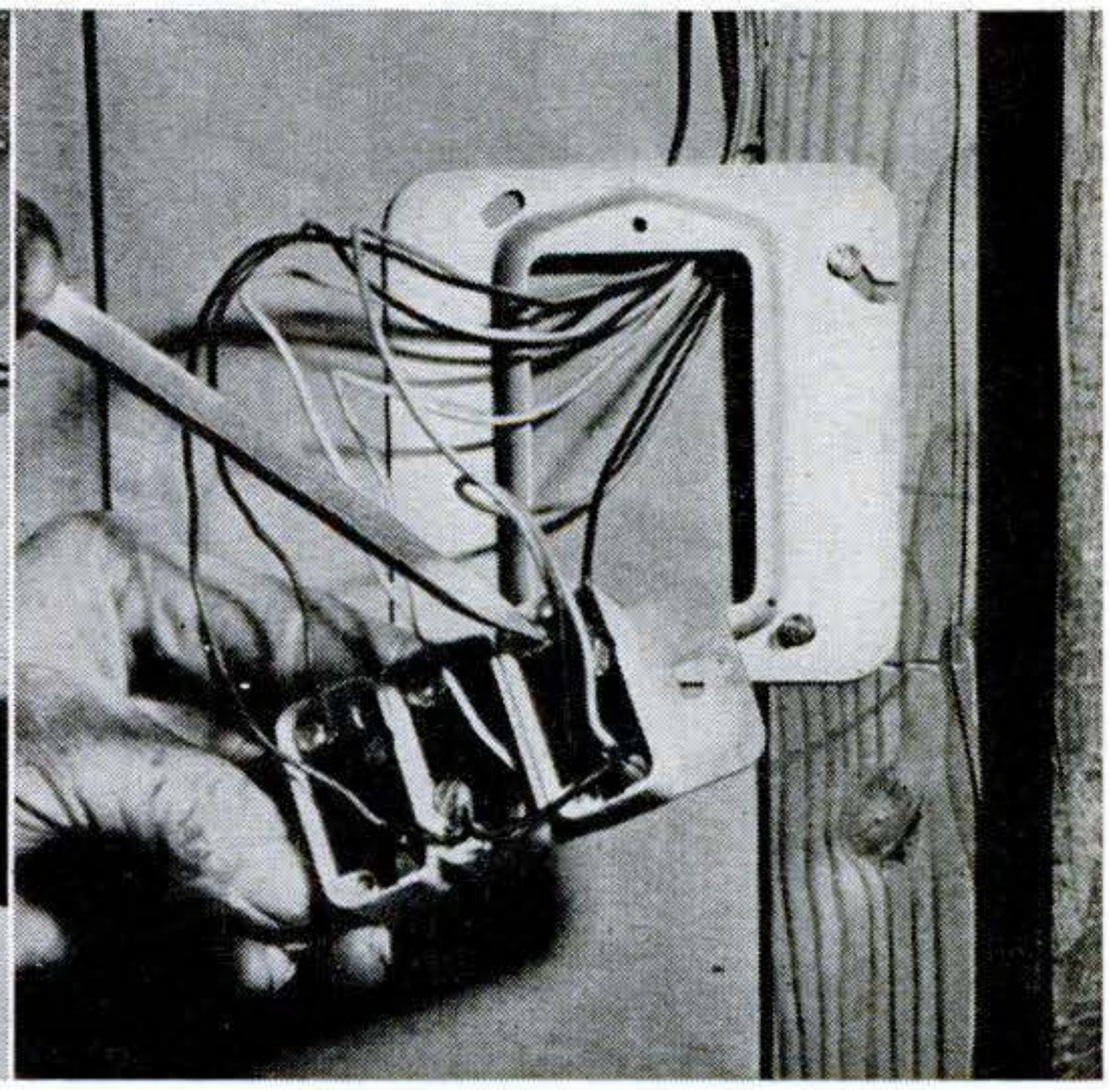
Copyrighted material

Take the Fireplace Along. A grill produced by Bennett-Ireland, Inc., Norwich, N. Y., may be set up anywhere in the backyard—or may be taken apart and carried in your car when you go on a picnic. Since it rotates 360 deg., you can turn it so the smoke blows away from you. A shelf keeps ashes off the lawn and a heavy base prevents the grill from tipping.

Toasts Round Sandwiches. When closed with two slices of bread and a filling between, this gadget snips off the bread, leaving a round sandwich that may then be toasted in the unit. Called Toas-Tite Ⓣ, it's made by Bar-B-Buns, Inc., of Cincinnati.



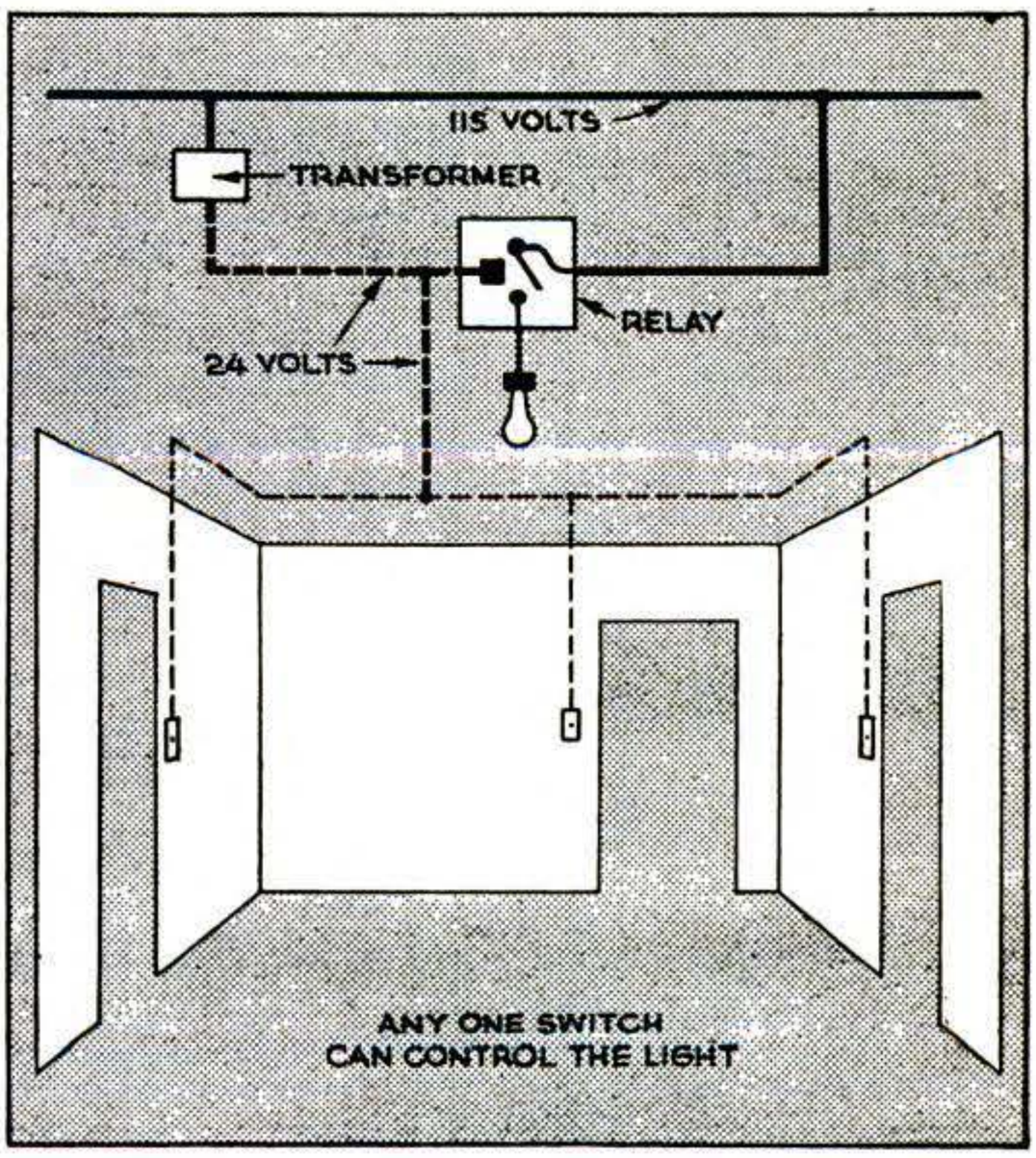
A magnetic relay is located near each light. It's actuated by the low-voltage control circuit.



Light-gauge wires connect the switches to the relay. Low voltage makes conduit unnecessary.

Low Voltage Controls Lights. In the conventional home wiring, there's usually only one switch to control each room light—even though the room may have several entrances. A low-voltage control system announced by the Square D company makes it possible to have one at every door.

Called Saflex Ⓣ, the system consists of a magnetic relay at each fixture to control the 115-volt circuit, and one or more S.P.D.T., lever-type switches in a 24-volt control circuit. Because of the low voltage, light-gauge wiring can be used instead of metallic conduits for the control circuits, thus reducing installation costs. Control wires can be run from each relay to as many switches as desired. Saflex Ⓣ also is adaptable to a master system that will enable you to turn on lights in several different rooms from one control point.



Copyrighted material

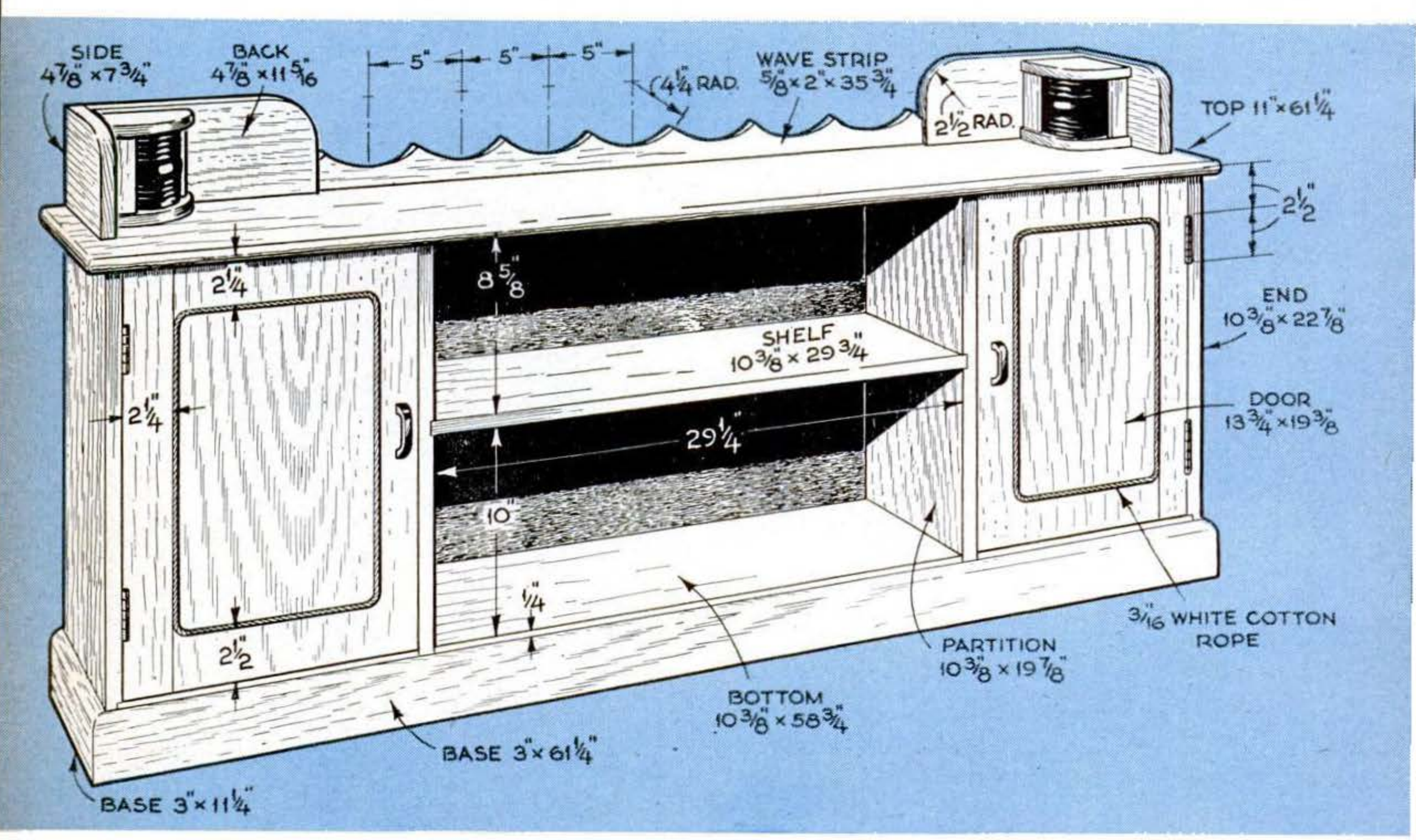
Marine Bookcase Built of Common Pine

By Glenn A. Wagner

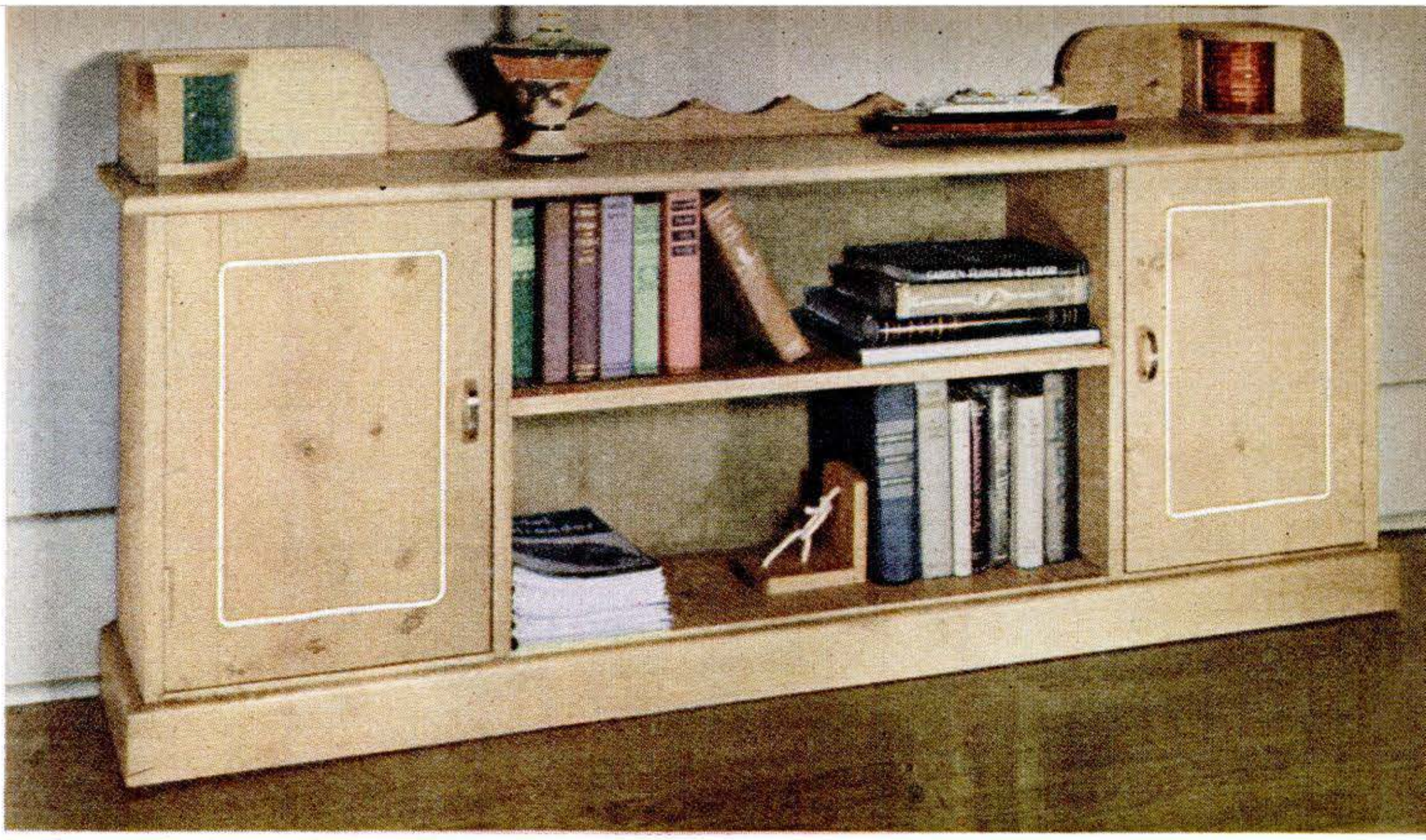
RED and green running lights, white-rope trim on the doors, and the wave pattern strip on the back add a dash of salt to the design of this nautical bookcase. The overall proportions are regular enough, however, for the unit to look at home in the living room as well as the game room or den. Either knotty or clear pine is appropriate to the seafaring theme.

Though power tools were used to build the model shown here and on the following pages, the job can quite easily be tackled with hand tools. Dadoes, for example, can be cut to uniform depth by clamping a wood strip along the saw blade ¼" above the points of the teeth; rounded edges can be planed or even formed with rasp and sandpaper; and a coping saw will easily cope with the wave-pattern strip. Moldings on the edge of the top and base may be hand planed if you don't have a shaper or a circular saw equipped with a molding cutter. All dadoes are through cuts with the exception of the four blind dadoes formed in the underside of the top to receive the sides and partitions.

Buy one red and one green Fresnel lens and build mounts to hold them. If you have no router, you can omit the grooves at top and



Copyrighted material

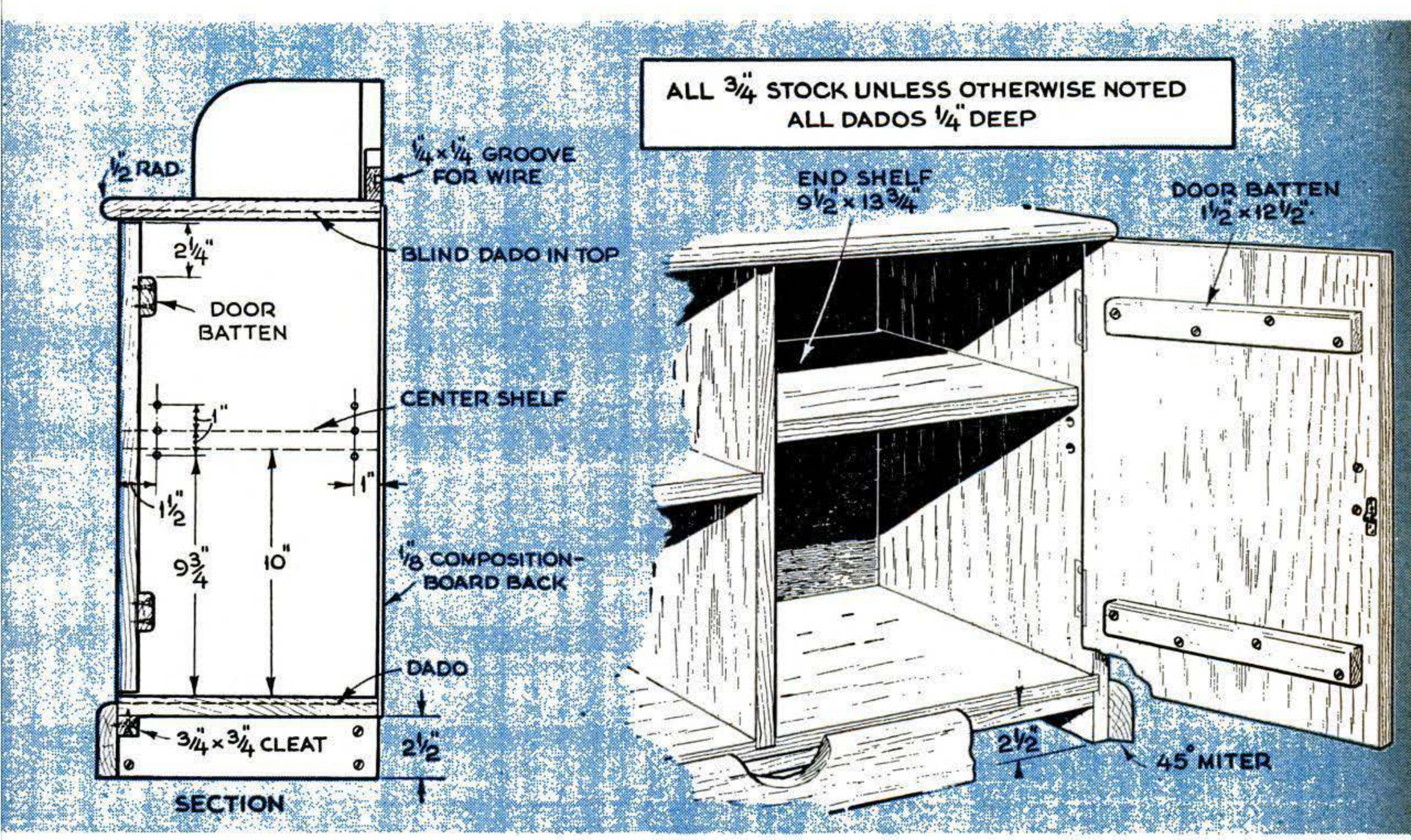


With its colorful, authentic air of the sea, this nautical bookcase is ideal for a man's den.

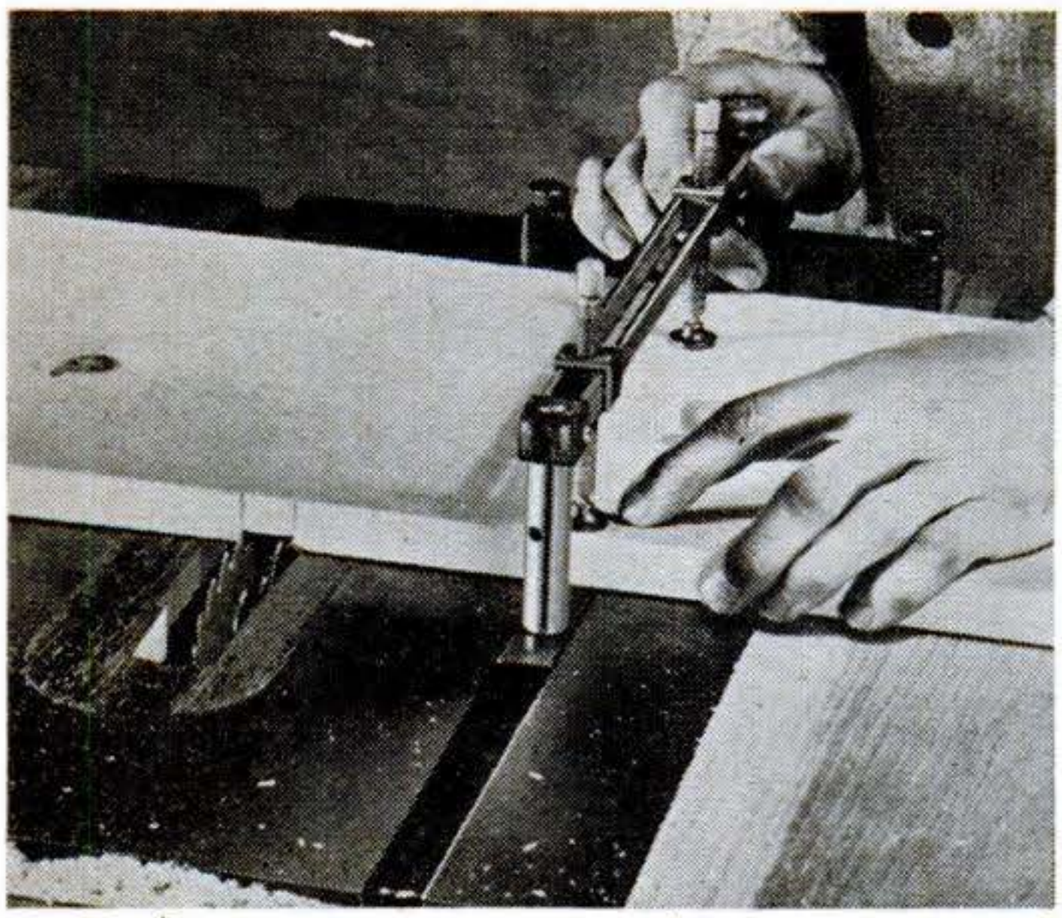
bottom and simply seal the inside lines where wood and glass meet with opaque tape or plastic weatherstripping.

Sand all parts well, apply glue to the joints, and assemble with finishing nails. The heads can be countersunk and the holes filled. Brace the pieces square before the glue sets.

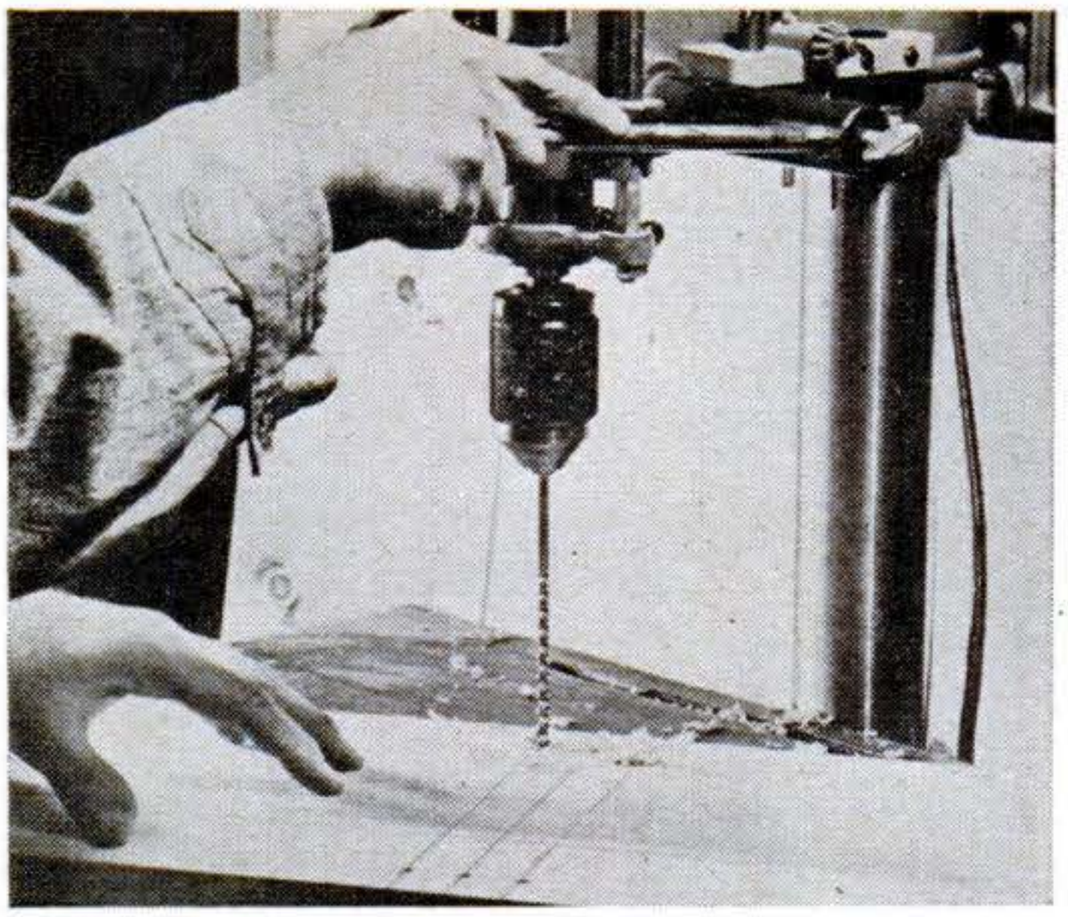
Three thin coats of orange shellac will give an appropriately soft finish. Rub each coat with fine steel wool before applying the next. Alternatively, a stain-wax finish can be brushed on, allowed to set, and the excess wiped off. Two coats of this, followed by one of wax, will give a soft, mellow appearance. Step-by-step photos follow.



Copyrighted material

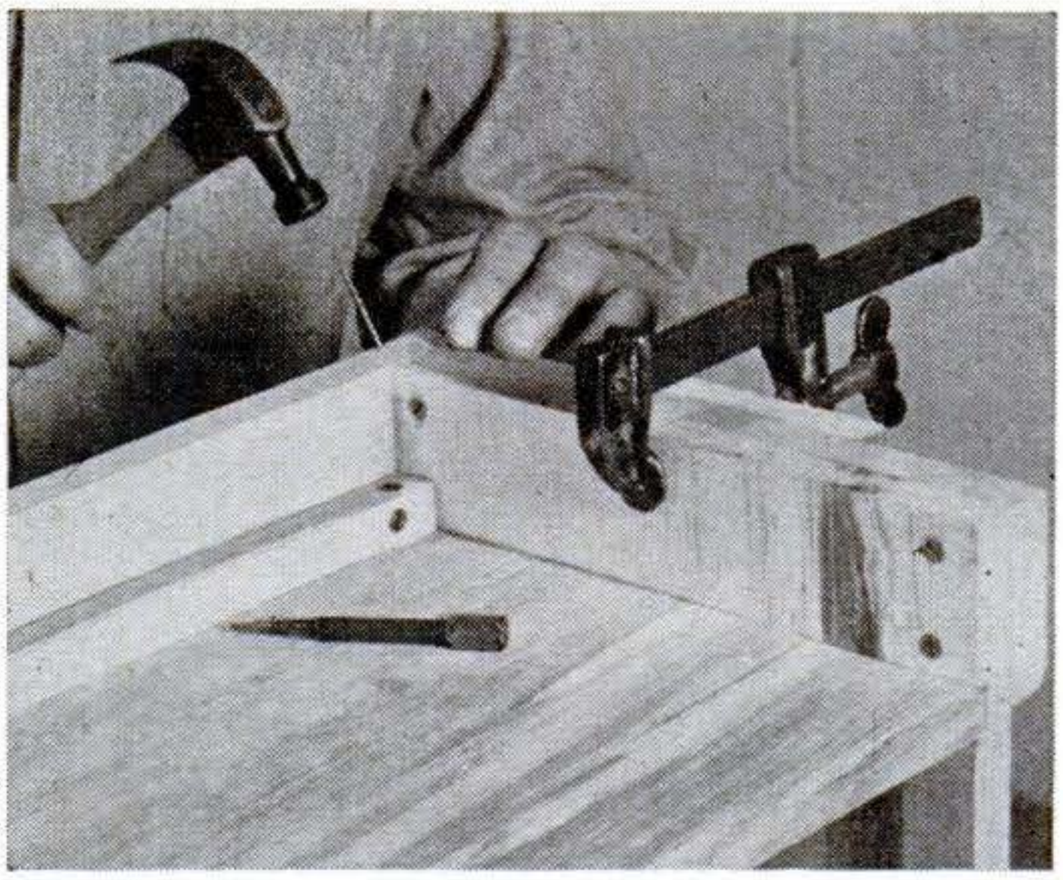


1. Dadoes are cut on a circular saw equipped with a dado head. Lay out the lines with the corresponding pieces clamped together. Clamp a stop to the table when cutting blind dadoes.

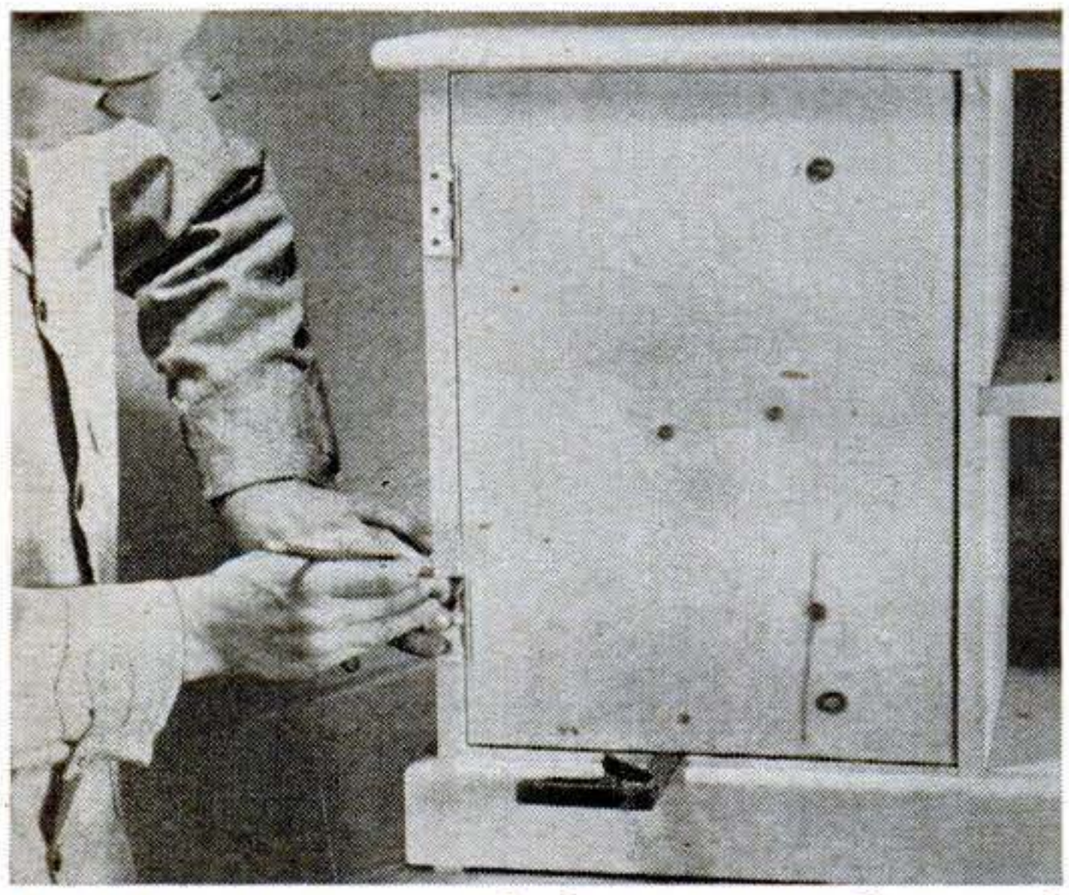


2. Holes for the movable shelf-support dowels in the end compartments are most easily made on a drill press. The depth stop is adjusted to about ½" and is uniform for all holes.

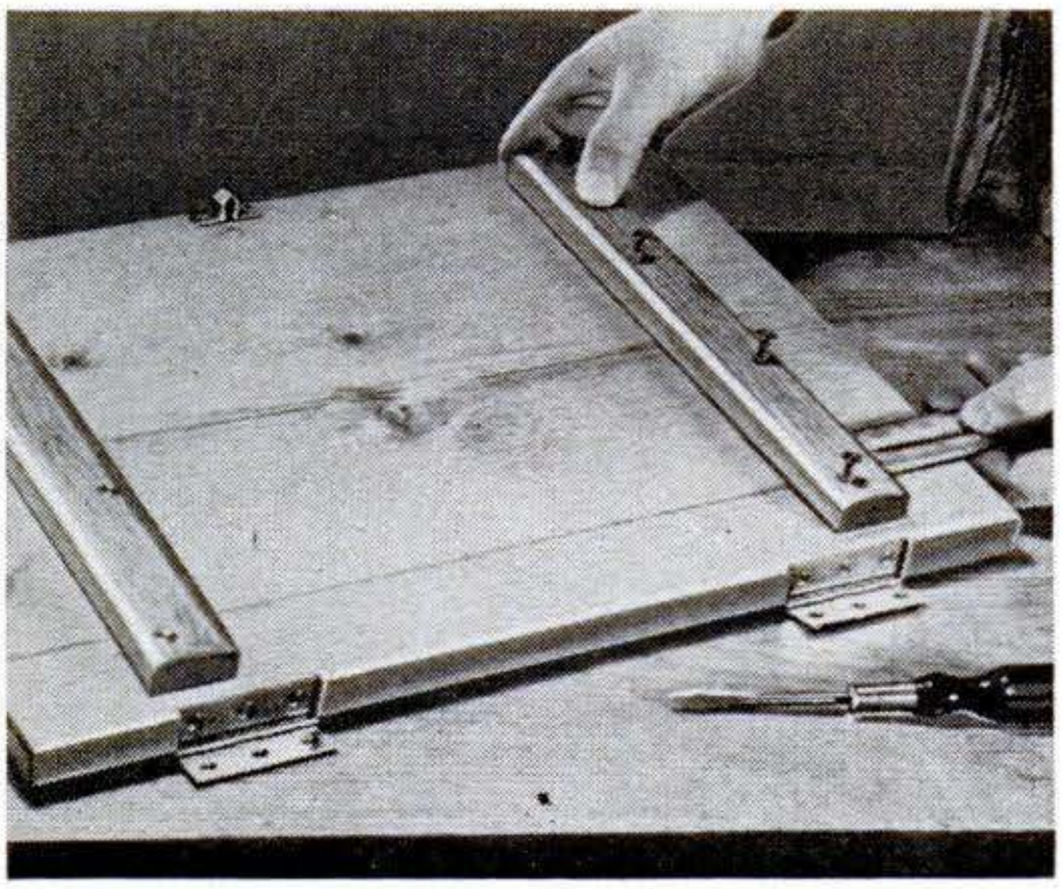
3. Assemble the shelf and center vertical partitions first; then attach the top and bottom. Turn the unit upside down and add the ends as shown. Joints are secured with glue and nails.



4. The base is fastened with wood screws. To hold the front part, attach a long cleat under the bottom shelf. Finishing nails are driven diagonally through the base and into the ends.

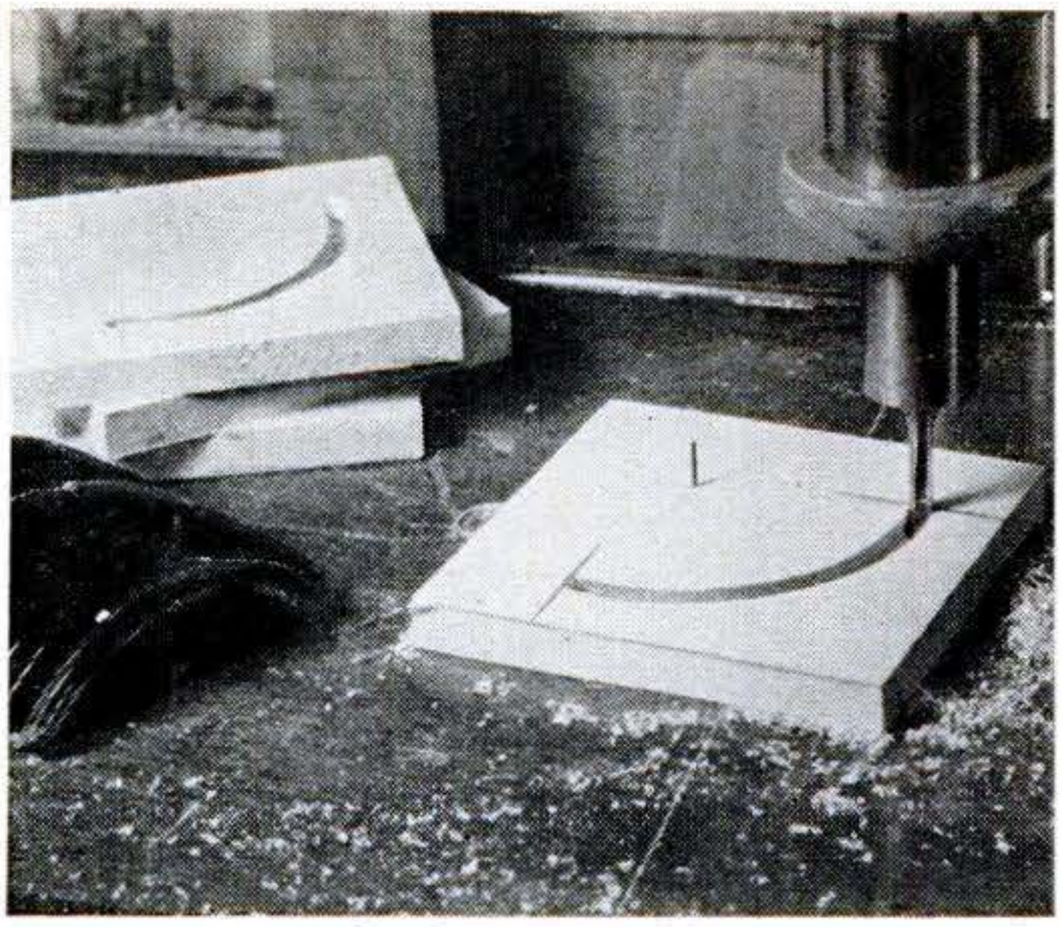


5. Allow clearance of about 1/16" all around both doors. Mount the hinges on the doors, mark off the proper positions as shown, and square the lines inside the endpieces.

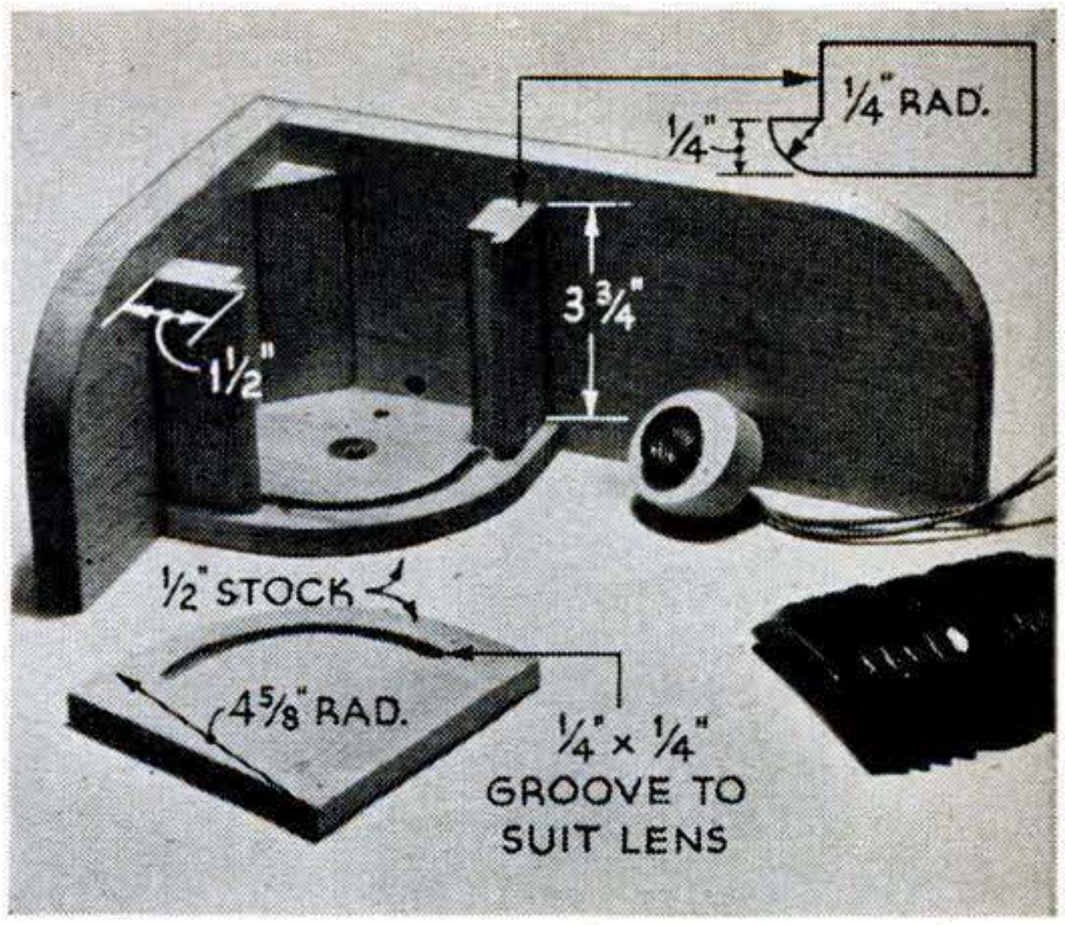


6. Gains, or notches, for the hinges are cut in the doors only; make them deep enough so that the second leaf will just lie flush with the edge. Attach pulls, catches, and battens.

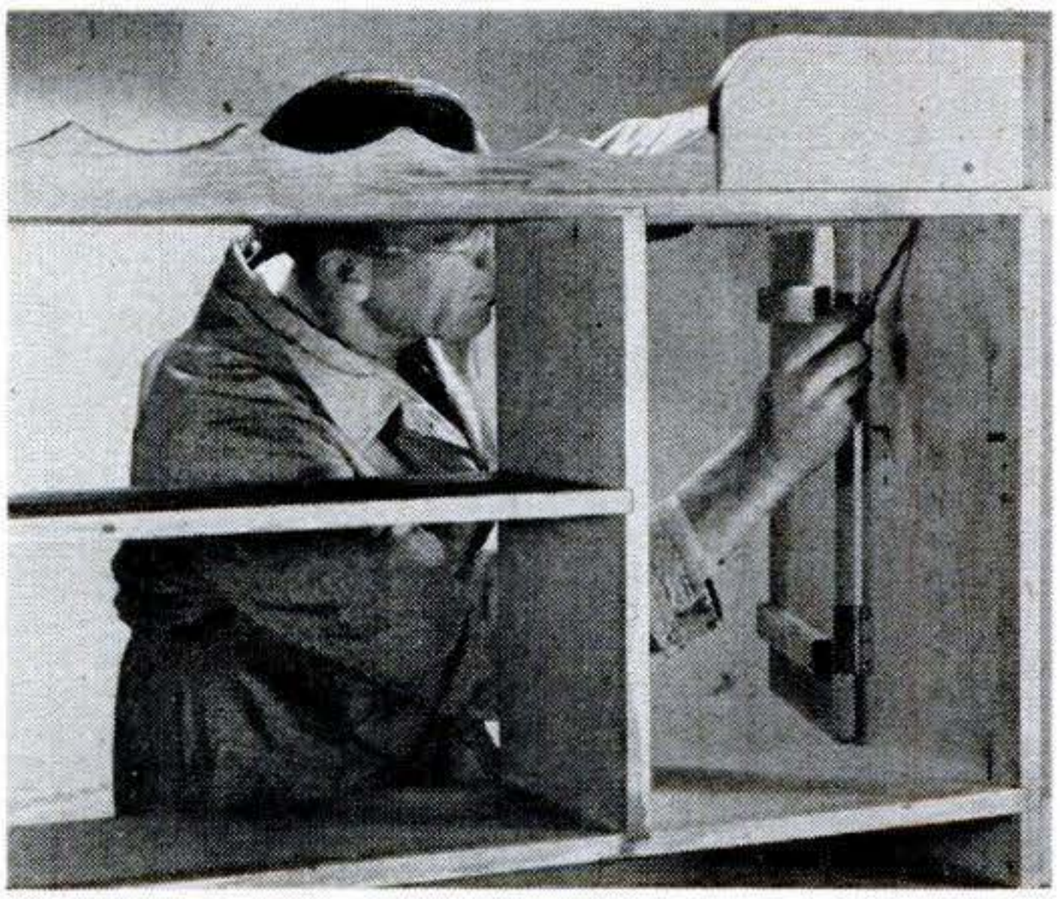
Copyrighted material



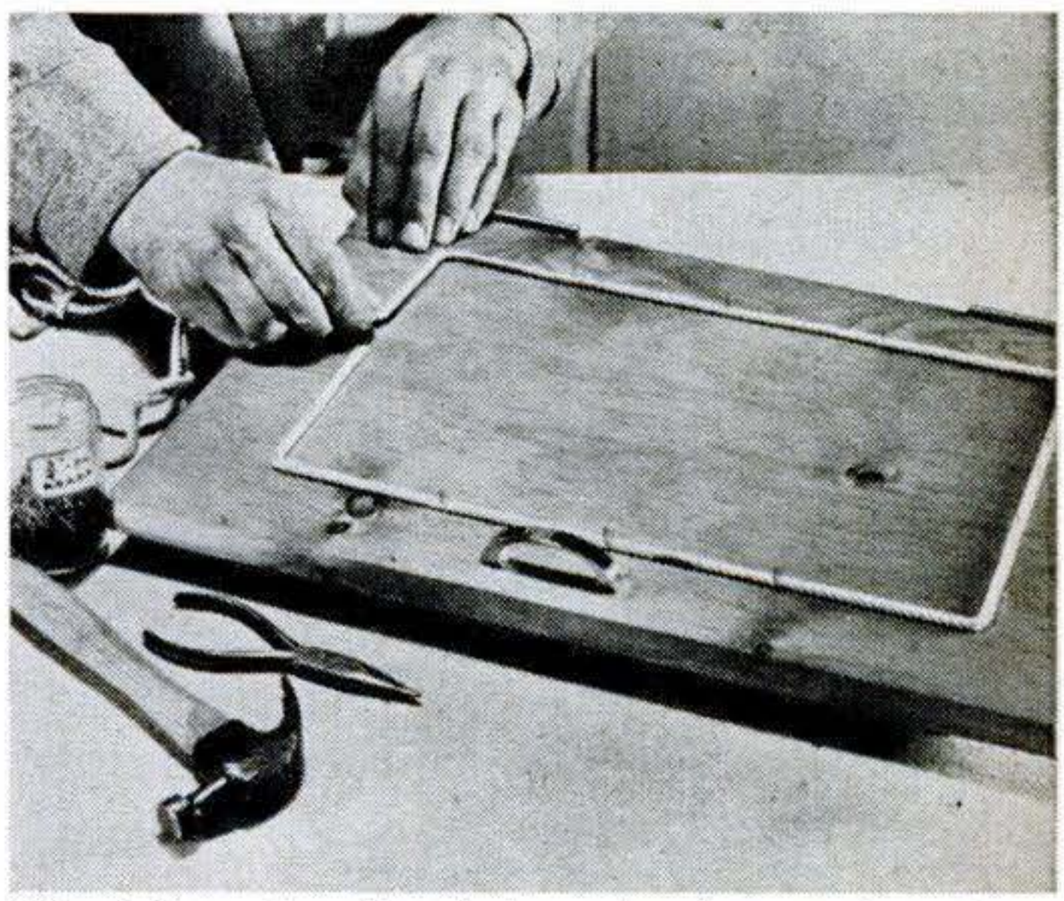
7. Grooves to fit the Fresnel lenses are made on a drill press fitted with a ¼" router bit. The work is pivoted on a long brad inserted in a hole in an auxiliary drill-press table.



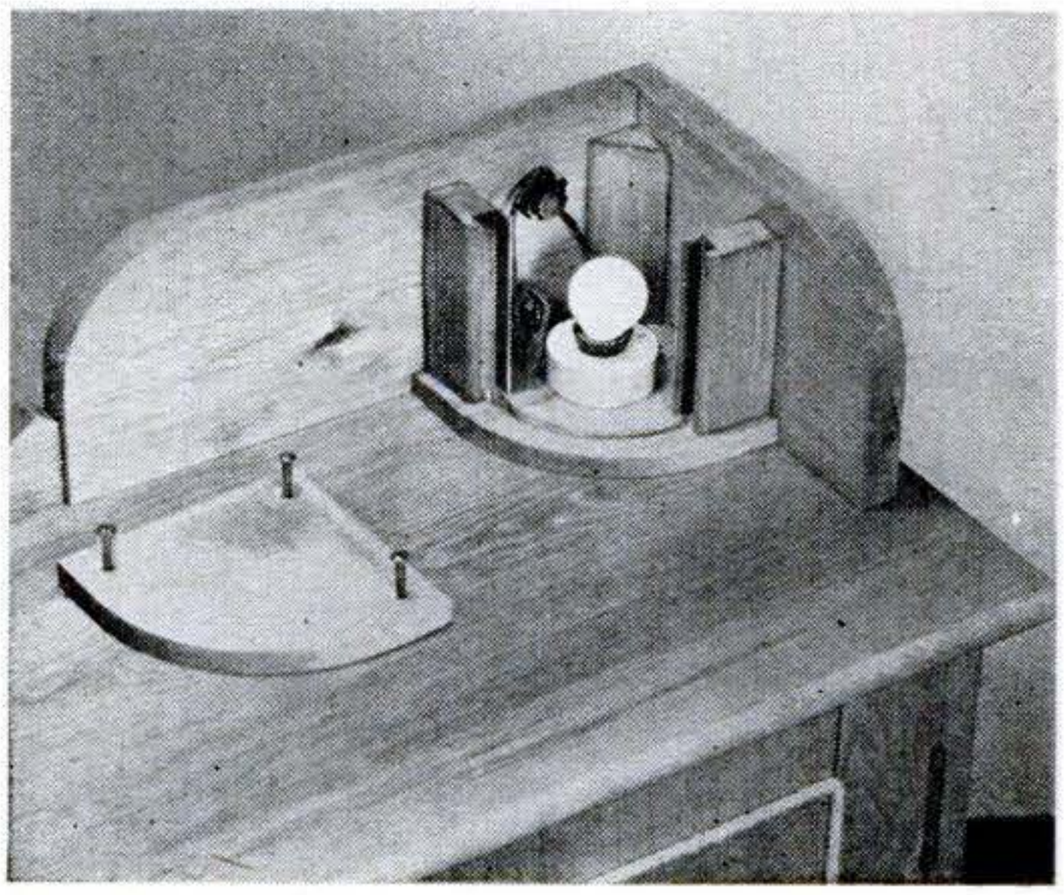
8. End and backpieces for the running lights are fastened to the lens base with brads, then the post and corner blocks are added. A wood disk holds the candelabra socket in place.



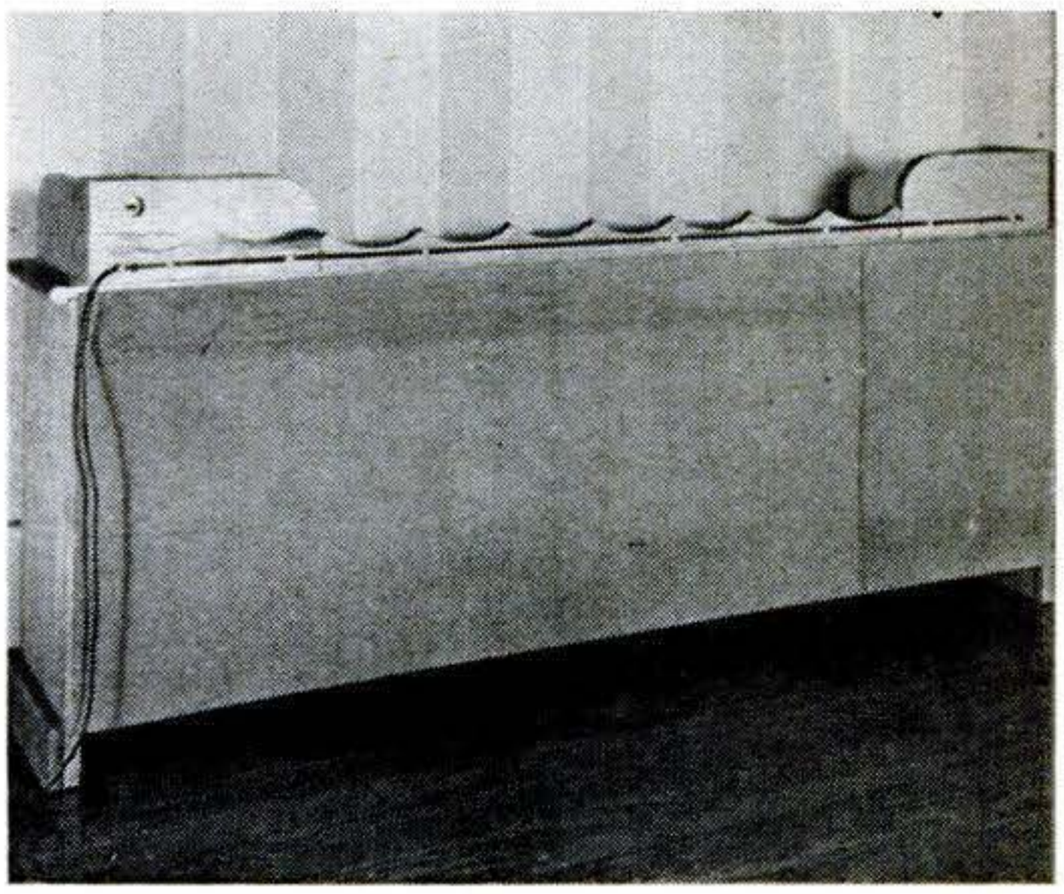
9. The wave-pattern strip and running lights are attached with screws driven from beneath the top. Before fastening them finally, mark and cut the ¼" by ¼" groove for the wire.



10. After the finish has dried, put the white cotton-rope molding trim on the doors. Stretch it taut and brad it first at the corners. Whip the ends to keep the rope from unraveling.



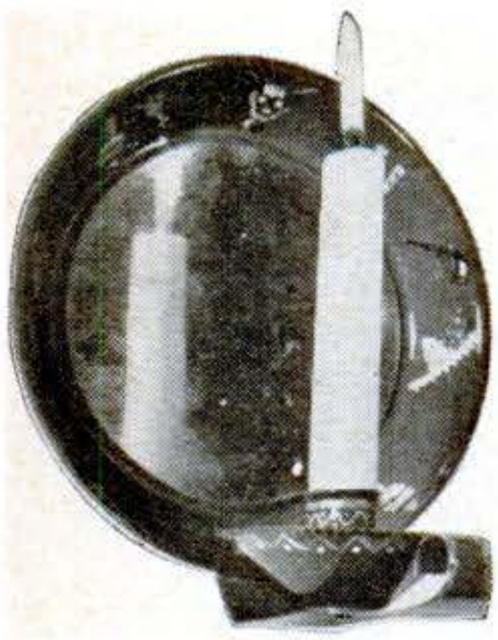
11. Detail shows construction of the running lights. The candelabra socket is fastened to a wooden disk that is secured to the base. The pushbutton switch is located above the light.



12. Wire is held in the groove with insulated staples. Place the switch wherever it is convenient. Here it is set in a counterbored 1" hole so that the button is flush with the back. END

Copyrighted material

Pie-Plate Candle Sconce Is a No-Solder Job



THERE'S a touch of the old West about this candle sconce that makes it just right for a playroom, closed patio, or informal dining room. Little equipment or experience is needed to put together a pair. Soldering, so vital in most metalworking, is eliminated. As for materials, a ten-cent piepan and a tin can are the major items.

For tools, you'll want a hammer, a drill or punch, and a pair of heavy shears. Round-nose pliers are nice for bending crimped edges. Tin snips cut easier than shears, but the latter will do provided you don't expect them to stay sharp.

Cut both ends out of a large tin can with a can opener, and cut the cylinder open lengthwise (wire-cutting pliers will get through the thick edge). Next, snip off both beaded edges.

Draw paper patterns for the bracket, candle cup, and socket, paste to the tin, and cut out the parts. Try to make clean, continuous cuts; avoid "nibbling" at the edge, which leaves needle-sharp slivers.

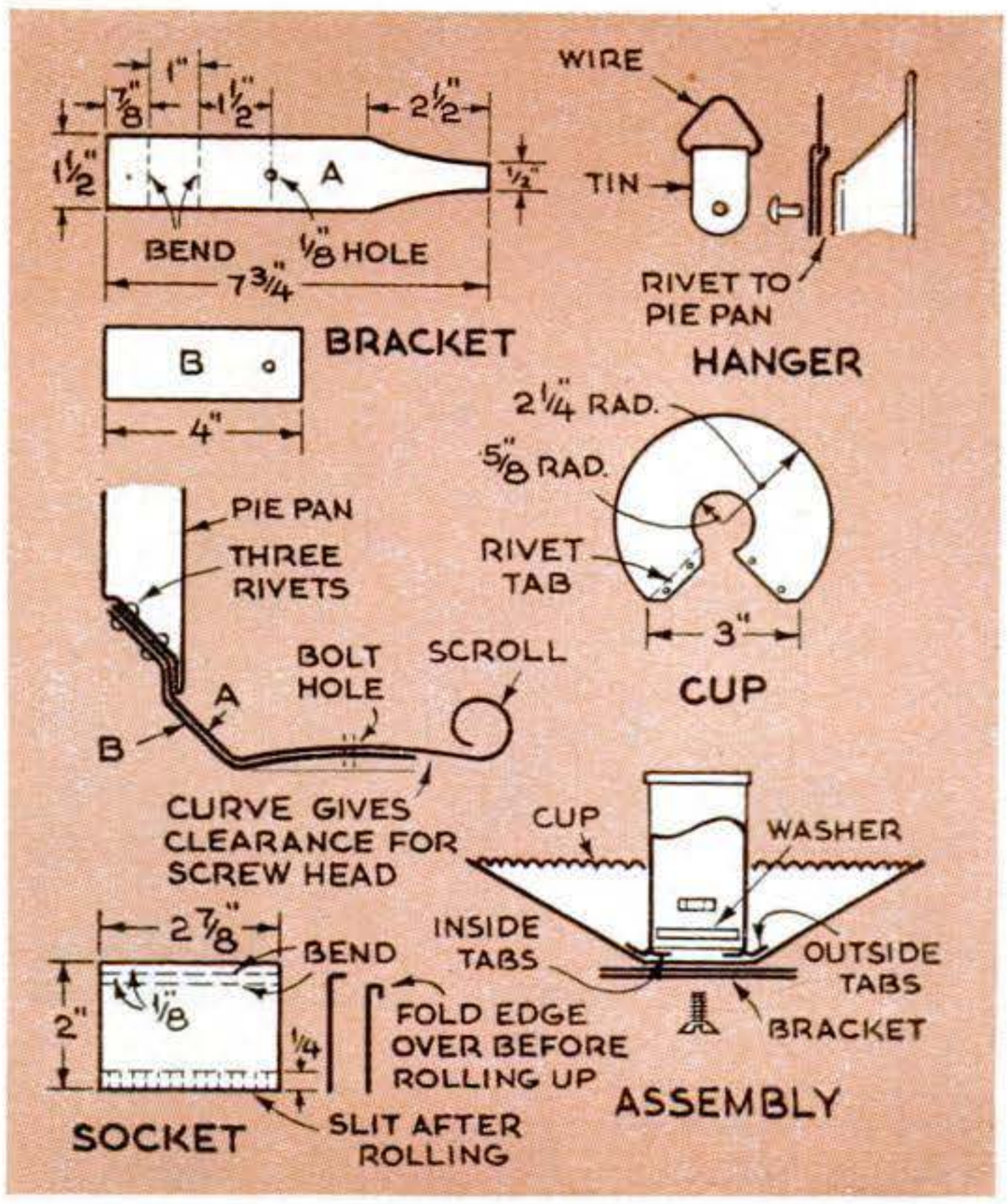
Note that the bracket consists of two thicknesses, as it must be fairly stiff. Make the bends in a vise or by gripping the tin between two bits of wood with a C-clamp. Drill rivet holes in both bracket and pan, and rivet them together. Copper tacks make good rivets. If you prefer, you can use bolts and nuts.

Shape the candle cup into a shallow cone with the fingers. You can leave the edge plain or crimp it with round-nose pliers. In crimping, bend the edge outward to produce a slight flare.

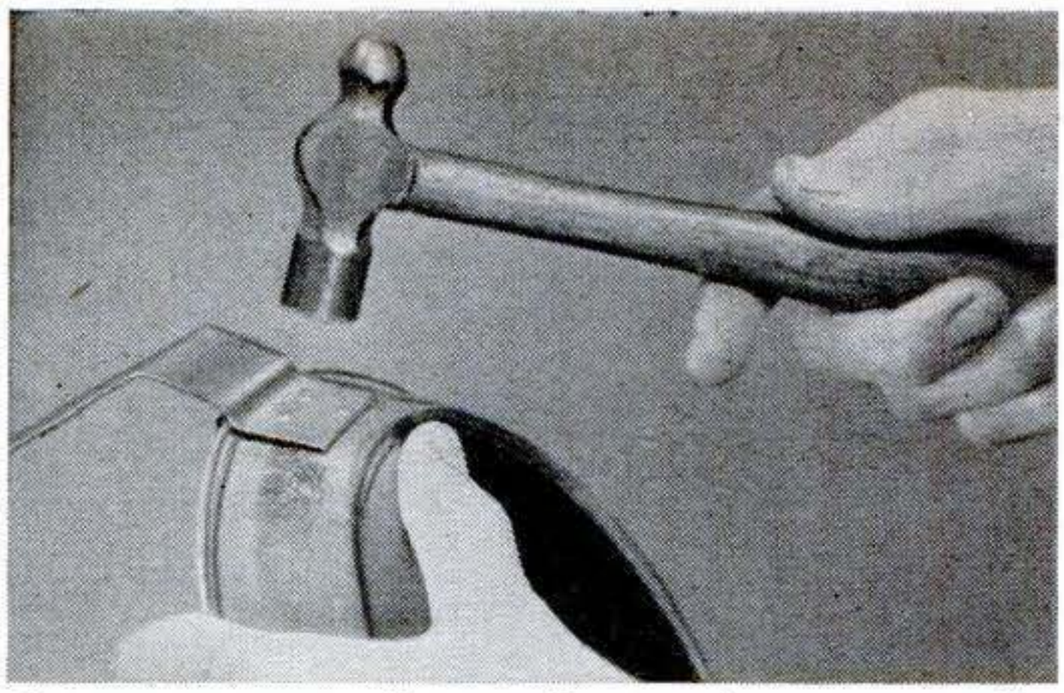
Hung on a wall or placed on any flat surface, this reflector makes the most of candlelight.

A neatly rolled edge on the socket can be formed by making two bends as shown in the drawing. If cleanly cut, a plain socket will also do. Bend the tin strip around a broom handle, leaving the seam open. Then carefully slit the bottom edge to a depth of ¼" all around. Bend half the tabs in, and the others out.

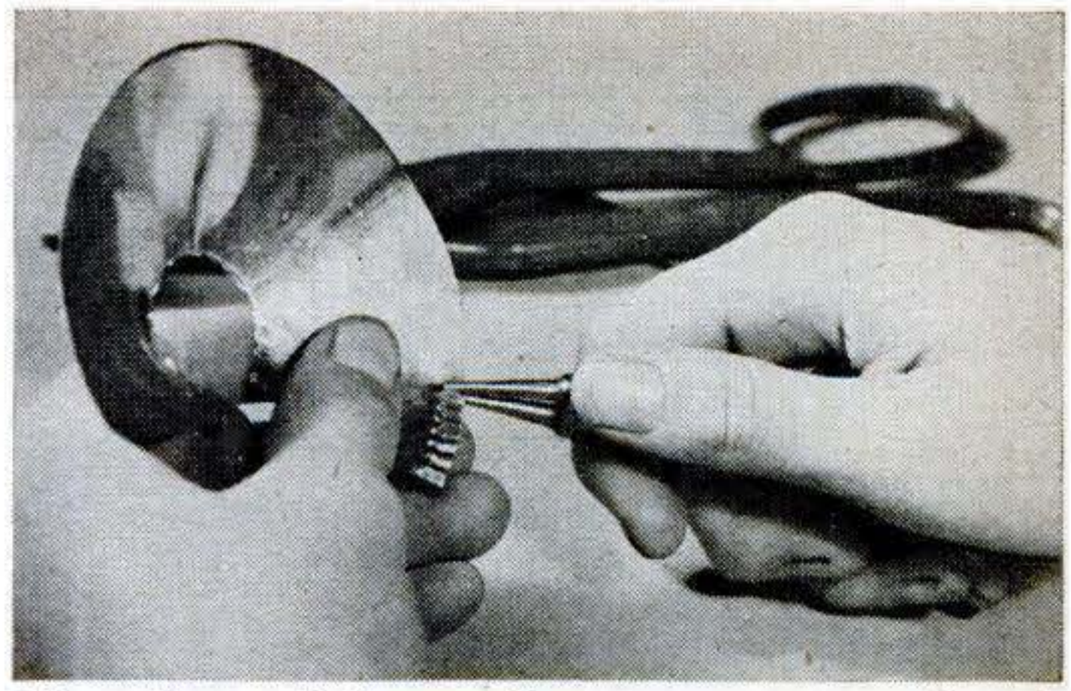
Drop a washer into the socket, then a nut, and put the socket into the candle cup, open seam to the back. Push a bolt through the



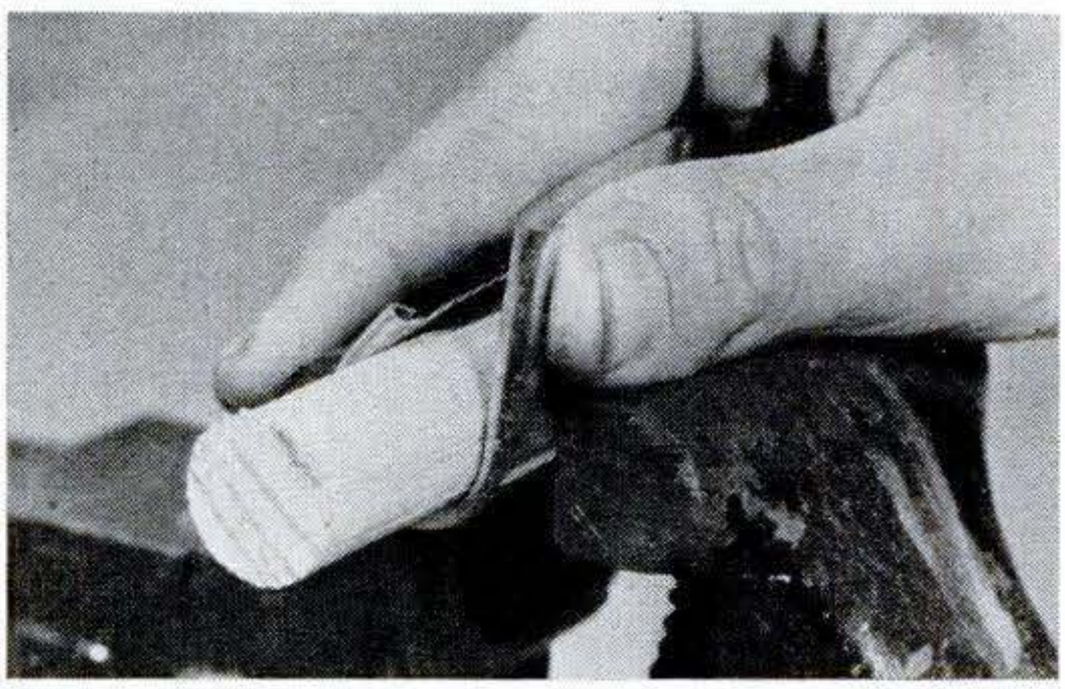
Copyrighted material



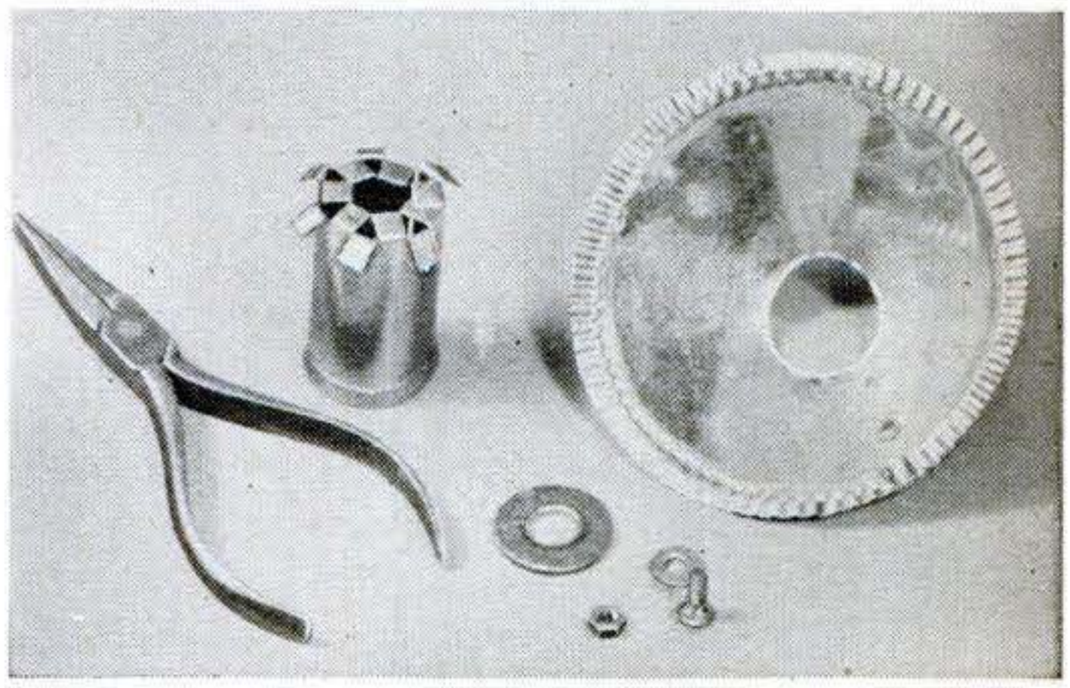
Copper tacks make good rivets for securing the bracket. Here stiff sheet metal was used. Thin tin-can stock should be doubled for stiffness.



The edges of the candle cup are crimped with round-nose pliers and bent down slightly for a flaring effect. Ends are riveted together.



A vise is needed to fold over the edge of the socket blank. Then the blank is rolled around a broomstick. The folded edge rolls itself over.



Socket tabs, alternately bent inside and out, lock the assembly. The washer clamps the inner ones; outer tabs clamp cup to bracket.

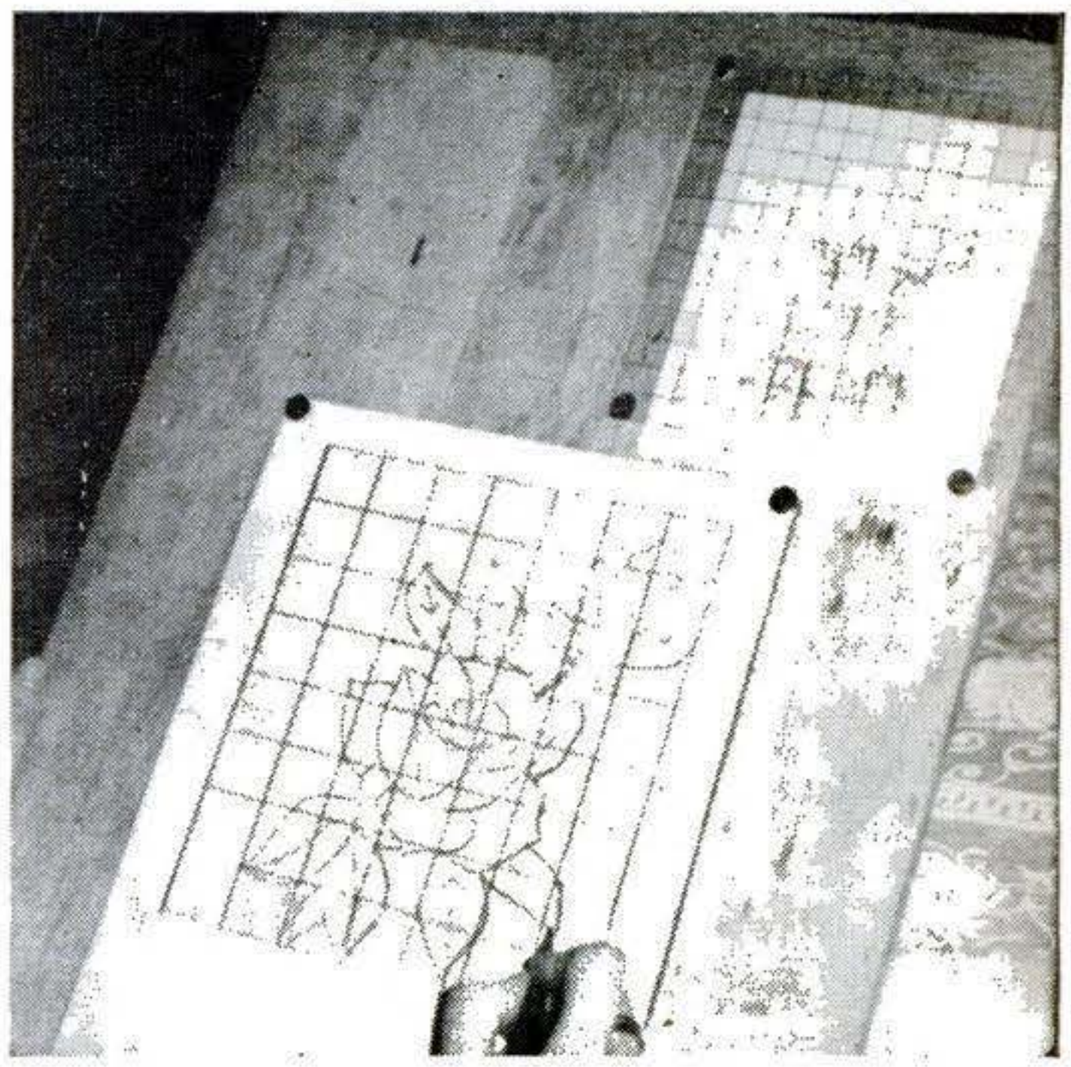
bottom of the bracket, adjust all the parts to stand straight and square, and tighten the nut. Rivet a hanging tab to the top of the reflector if you want to be able to suspend it from a wall hook.

Apply enamel undercoater and a coat of ground color to everything but the middle of the piepan, leaving this bright to reflect light. Then you're ready for decals or some freehand brushwork. Use colors in oil, squeezing a bit on a plate and blending with it a little clear varnish and turpentine.

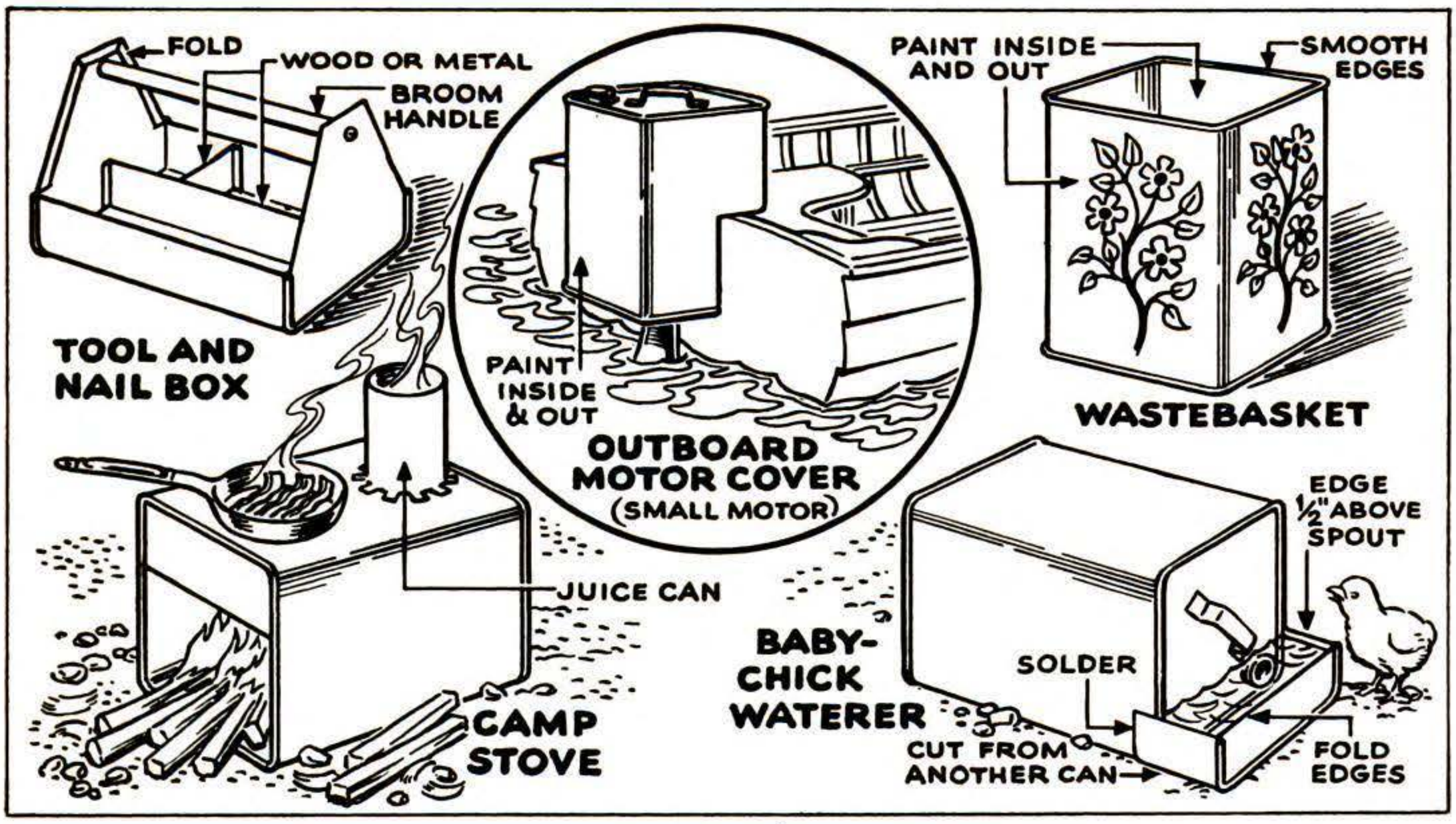
Squares on Plastic Aid in Enlarging Drawings

A THIN sheet of clear plastic ruled with a grid of squares will come in very handy when you want to copy, enlarge, or reduce a drawing. Secure it on top of the original with tacks or tape. Draw a grid of squares of whatever size will give you the desired scale, and follow the drawing from point to point on the grid. No marks are made on the original, which is left just as it was by removing the plastic.

The size of the squares on the plastic is not critical. For most copying work ½″ is about right. Scribe the lines carefully and not too deeply, using a sharp-pointed instrument. After the lines are marked, apply a little ink with a cloth pad, rubbing it into the scratches with a circular motion. Wipe off the surplus with a clean cloth.



Copyrighted material



New Ways You Can Use Old 5-Gal. Containers

SUCH liquids as motor oil, floor finishes, and spray materials frequently come in 5-gal. cans. With a little ingenuity, the empty containers can be made to serve a number of purposes around the home, farm, or camp.

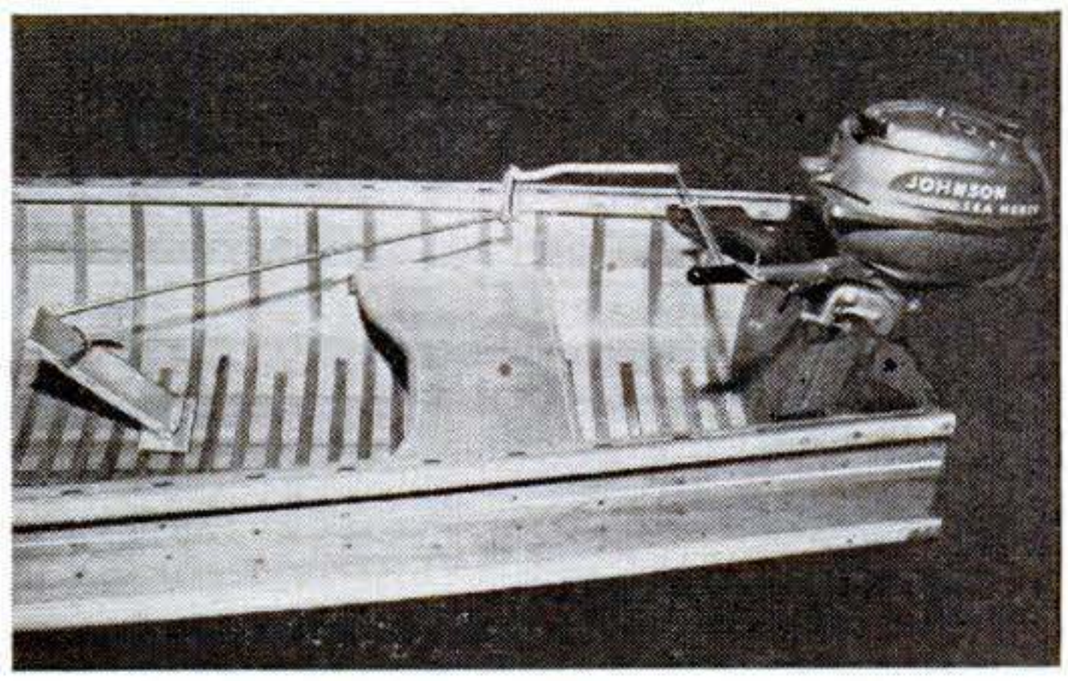
Some are suggested above, but there doubtless are many others. For instance, just cutting away the top from one would give you an easy-pouring paint-mixing container. In most cases you can accomplish the desired conversion with a can opener of the type that leaves a smooth edge, a pair of tin shears, a mallet, a metal straightedge for bending over edges, and perhaps a soldering iron.

Since the chimney of the camp stove can't be soldered, cut tabs on the edge of a juice can, bend alternate ones out 90 deg., insert, and bend the others inside the large can.—*Ralph S. Wilkes, Keuka Park, N. Y.*

Trailer Hauls Boat to Water

WITH this trailer unit, you can haul a boat to a beach or stream, launch it yourself, and lift it out of the water—again by yourself—when you're ready to go home.

Simple leverage does the job. Straddled by the trailer, the boat may be lifted or lowered with ease when the rear end of the drawbar is hooked into a suspension unit mounted inside the craft. A hook at front holds up the bow of the boat for hauling. Holsclaw Bros., Inc., Evansville, Ind., makes the trailer in three sizes.



Pedal Lets You Steer by Foot

EQUIPPED with a pedal and strap into which you hook your foot, an outboard steering control offered by the Northwest Marine Co., of St. Paul, Minn., enables a fisherman to keep both hands free while trolling, casting, changing bait, or landing fish. Operated either by pushing down or pulling up your foot, depending on the direction you want to turn, the control steers the boat through a bell-crank arrangement.

Copyrighted material

Midget Firewood Baskets Serve Candy and Cigarettes

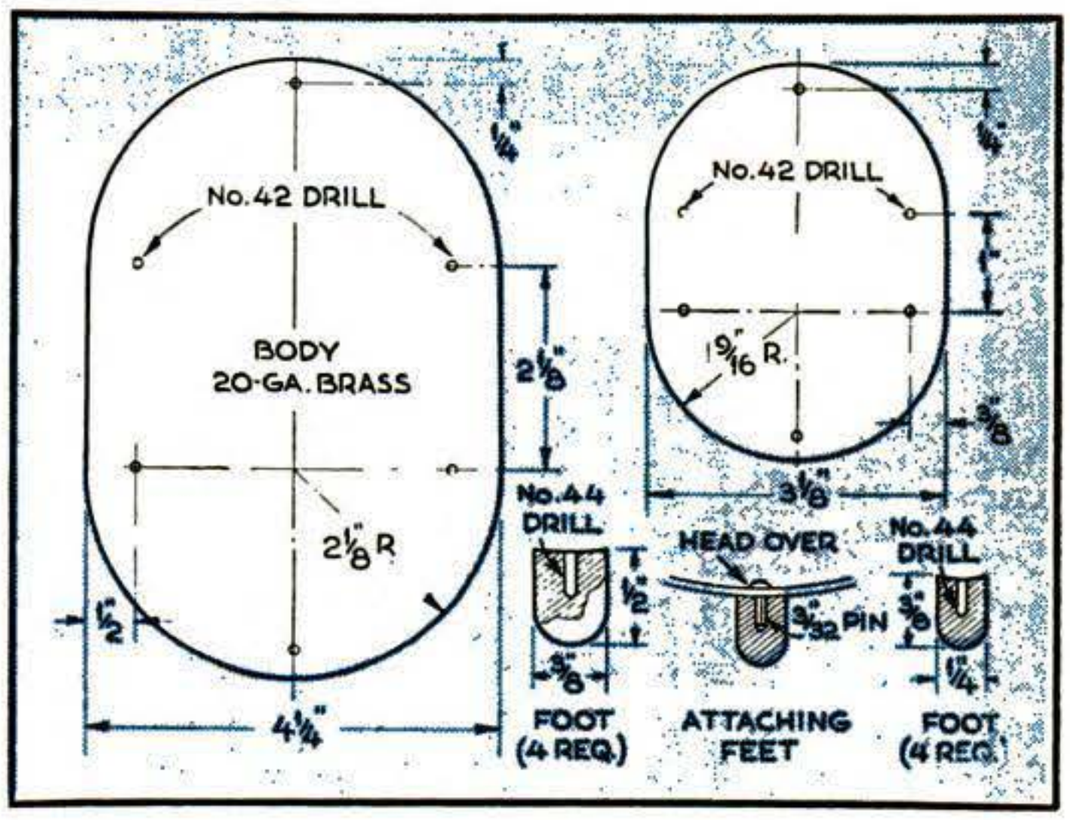
PLACED on the coffee table, a pair of miniature firewood baskets in polished brass are sure to draw favorable comments. One may be used for cigarettes, the other for candy.

Construction is begun by laying out the ovals on sheet brass, 20-gauge or heavier. After cutting with a pair of snips, place the pieces on a smooth metal plate, such as the bottom of a flatiron, and tap with a mallet to flatten. Centerpunch and drill the six No. 42 holes, file off burrs, and round the edges slightly. Remove any scratches with fine emery paper and buff to a high luster.

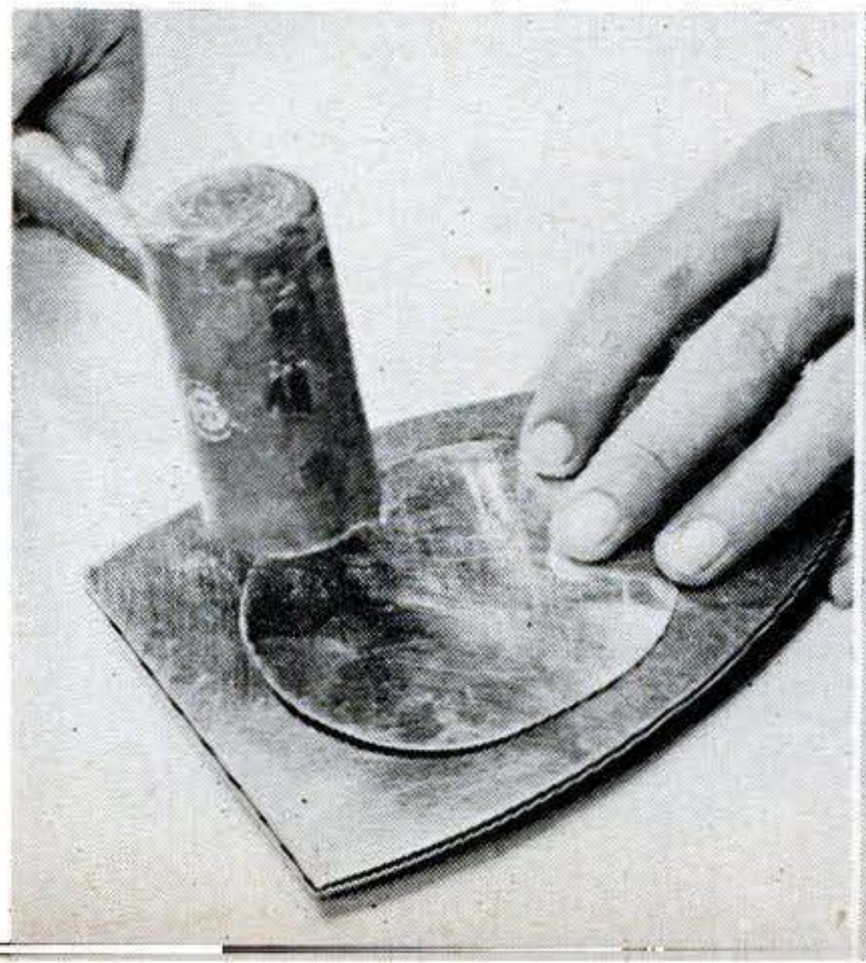
Use a length of 2½"-diameter bar stock or pipe to form the baskets. The smaller is curved around the form completely, but the larger has just the sides turned up. Holding the pieces over the round stock, tap them with a mallet to smooth up the turns and to work-harden the brass.

Feet for the big basket are ½" lengths of ⅜" brass rod, and those for the smaller are ¼" round stock. Drill a No. 44 hole ¼" deep in one end of each piece, round the opposite end with a file while the work is revolving in a lathe or drill press, and relieve the other end with a half-round file to fit the contour of the basket.

Cut 5/16" lengths of 3/32" wire, slightly taper one end, and drive into the feet. Then push the pins through the holes in the baskets and upset the heads with a ball-peen hammer while resting the foot on a metal block. The handles are made of 5¾" and 9¾" lengths of 3/32" wire or brazing rod.—*Bill Luther, Los Angeles.*

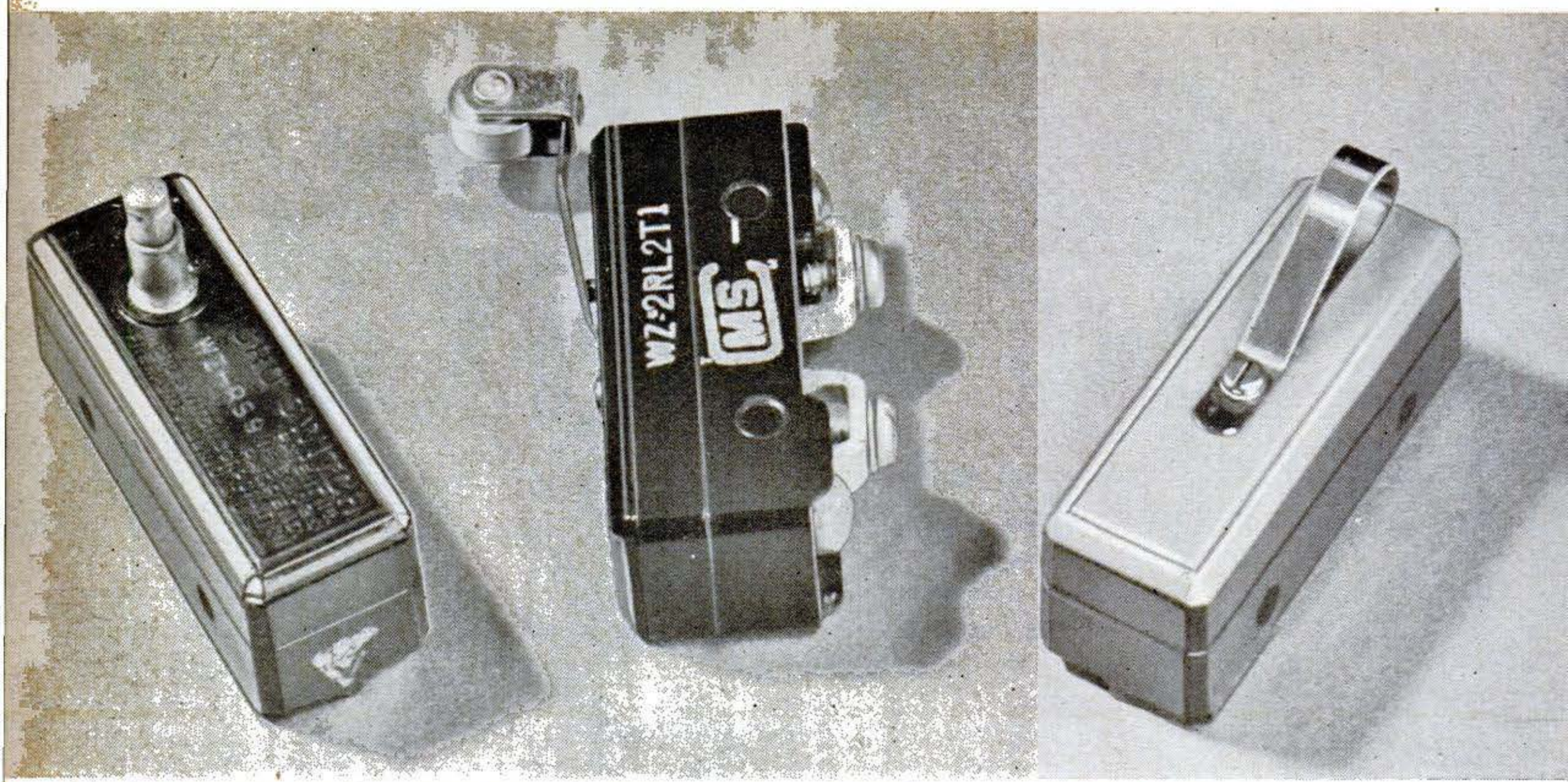


Flatten the ovals with a soft mallet. After polishing, form them around a 2½"-diameter pipe or bar stock, again using the mallet as below.



Head over the pins that hold the feet with a ball-peen hammer, resting the feet on a metal block. Form the handles over a length of pipe.

Copyrighted material

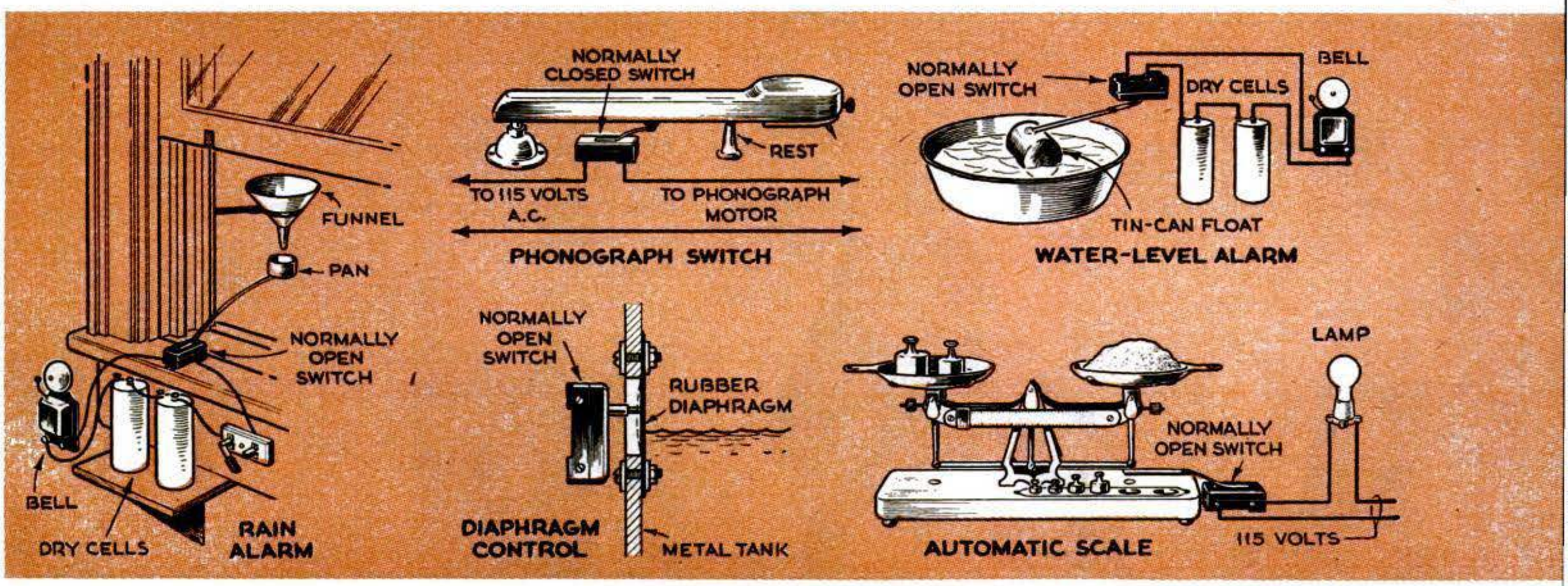


Various actuating devices (here a button, roller, and leaf) come on similar basic switches.

Midget Switches with a Hair Trigger

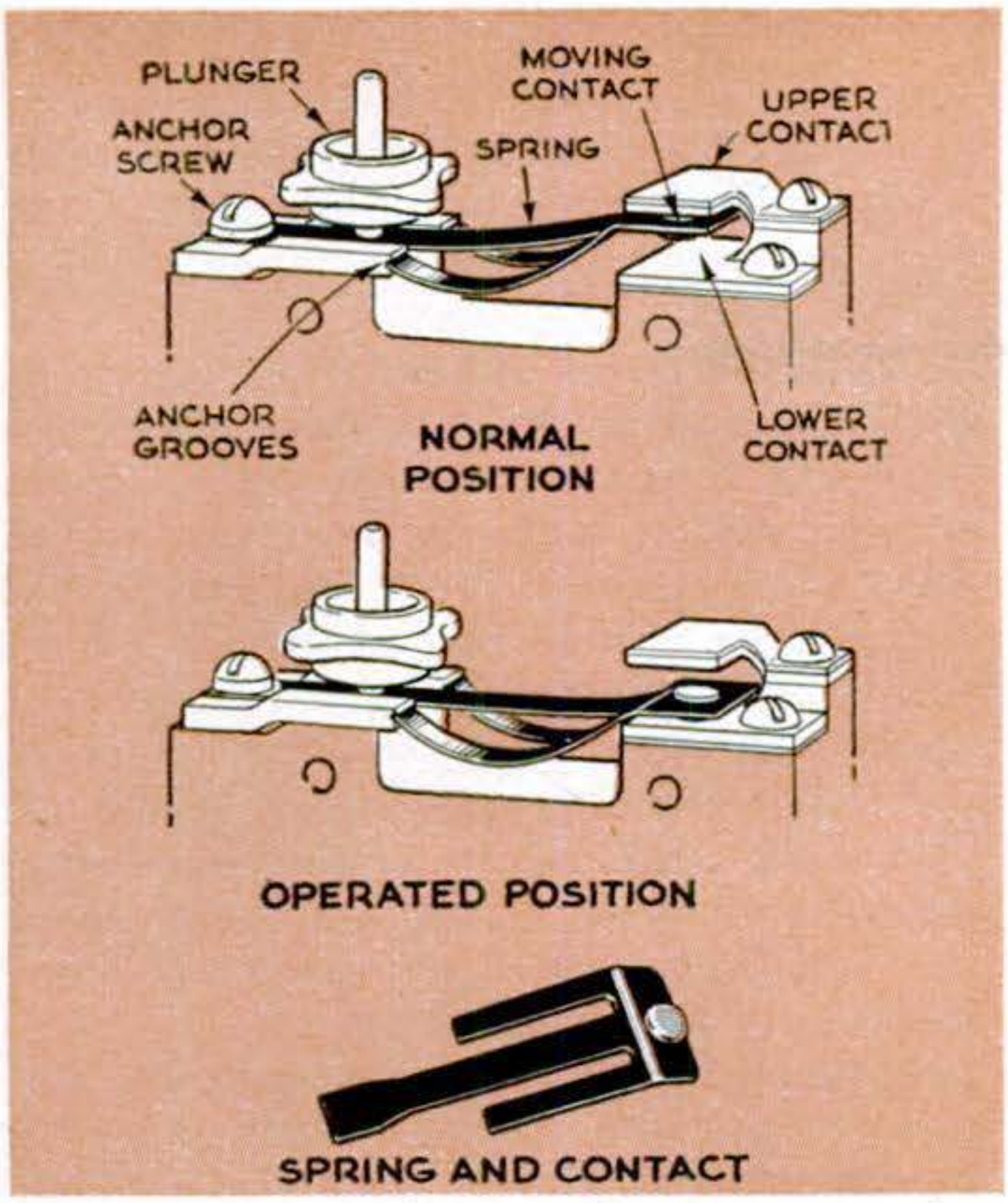
Say good-by to knife switches and get acquainted with these versatile and precise electrical handy men.

YOU CAN put one of these midget switches in your watch pocket, or hold a couple in your closed hand. Yet at 115 volts, one of them will easily handle 10 amp.—ample to run a ½-hp. shop motor. What's more, it'll do it with an operating pressure of a few ounces, and with a plunger travel of less than .005″. Better yet, it'll

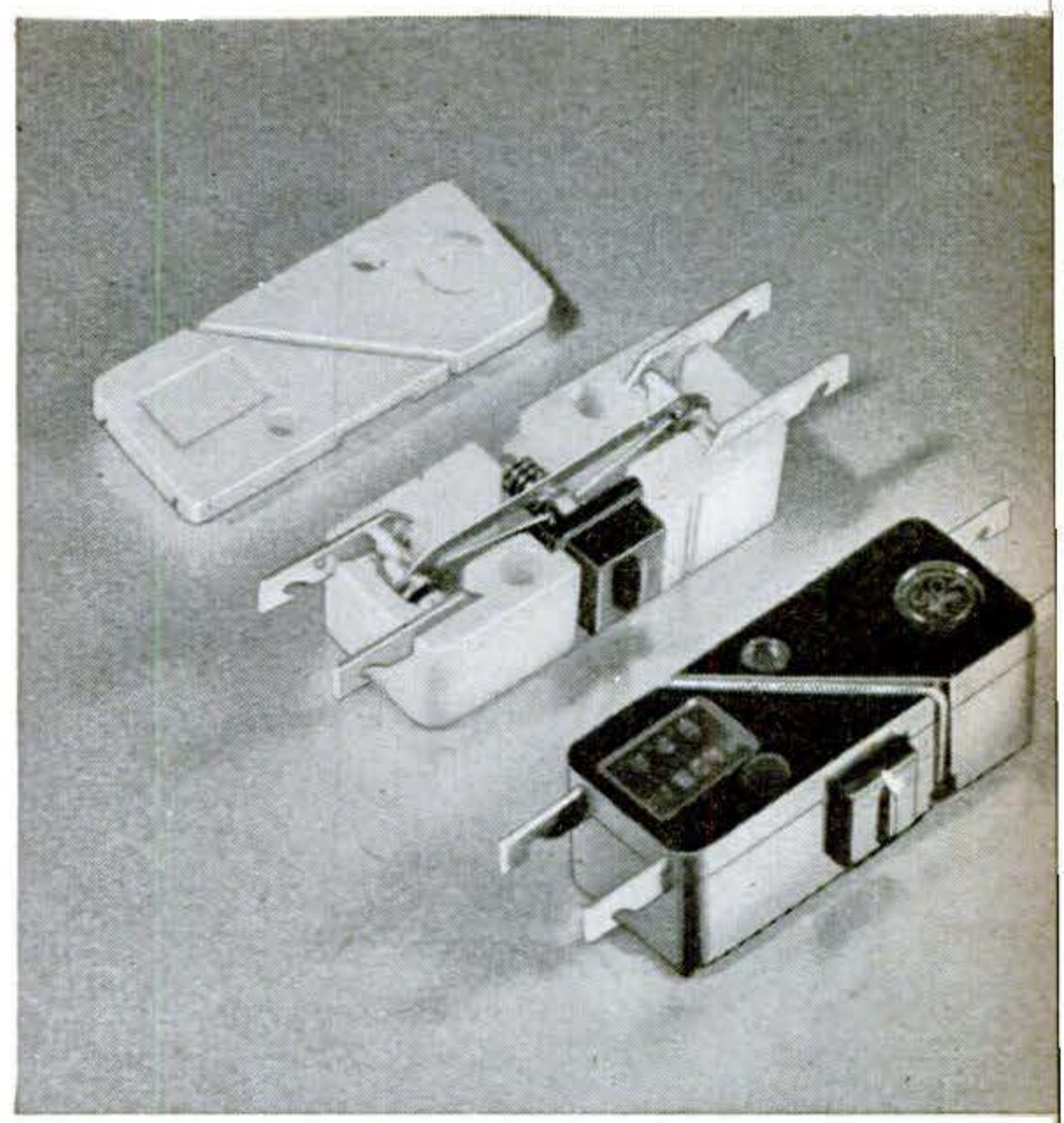


Countless applications in the home and shop will be found for these switches. Here are a few.

Copyrighted material



How it works is shown in this Micro Switch® phantom view. At rest the bowed spring arms hold the moving contact against the upper one; depressing the plunger snaps the spring down.



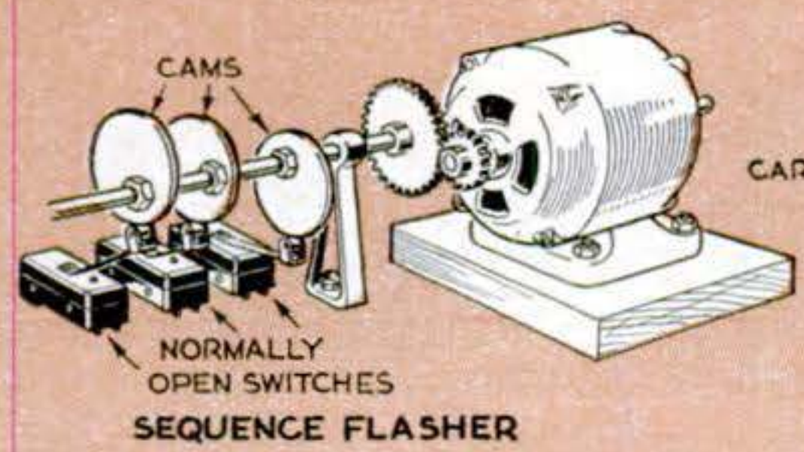
Lighter and smaller, this GE Switchette® is designed for light-duty service. The upper one has its cover off to show spring action. It can be either normally open or normally closed.

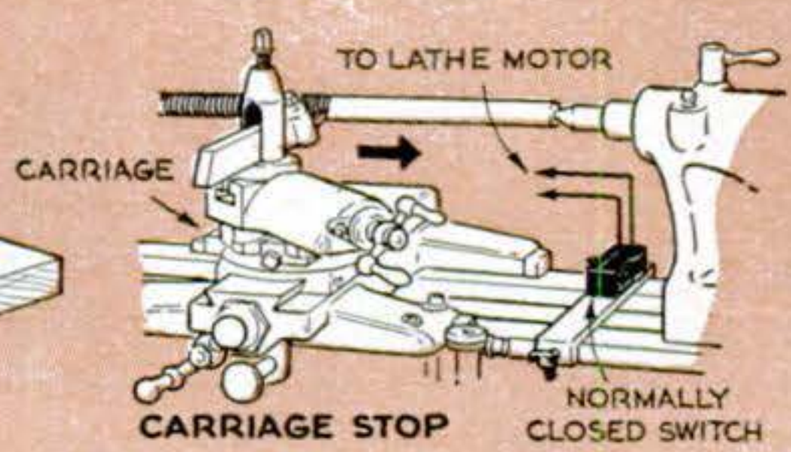
do its job in a matter of a few milliseconds, and will repeat the same task precisely and reliably for upwards of 1,500,000 times.

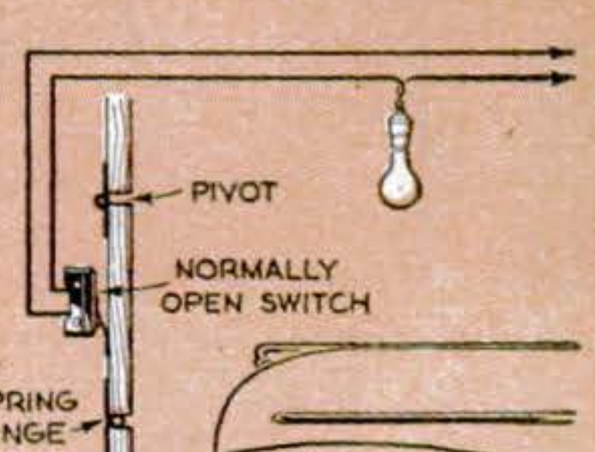
What this means for the workshopper (or the householder with a yen to put more electrical servants to work for him) is considerable. Up until recently, having chiefly knife and toggle switches at his disposal, he has been handicapped by their mechanical limitations and by the often laborious job of installation. With snap switches, the sky (and his own ingenuity) are the limit.

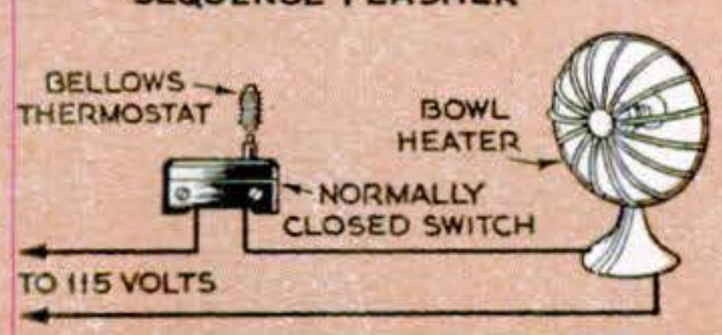
Though small enclosed switches of this type began to appear in industry about 15 years ago, it wasn't until shortly before the war that they became common. With great volumes of them now available in war-surplus stores, and with new ones obtainable at electrical and radio-parts stores as well as mail-order houses, the craftsman who wishes to use them in his home or shop can choose from a variety of makes and styles.

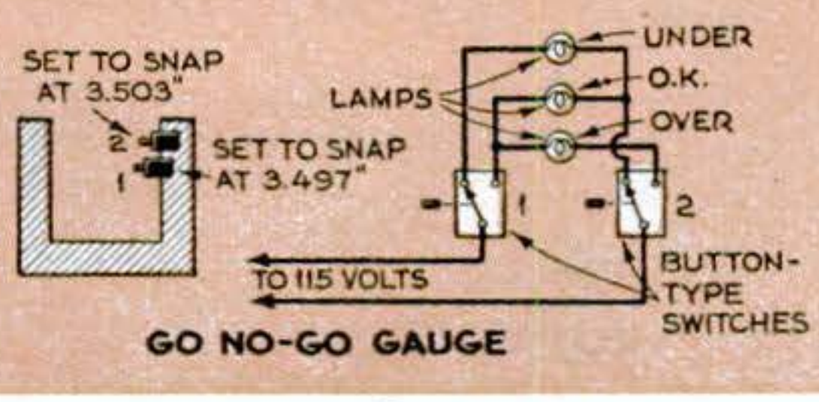
While the operating details vary from make to make, such switches generally employ a curved arm of copper that's alloyed











Sensitivity, shortness of travel, fast action, and repeat accuracy are switch characteristics.

Copyrighted material

with beryllium for springiness and resistance to fatigue. This arm, carrying movable contacts at its free end or ends, is mounted in a plastic case in such a way that short movement of a plunger will cause the contact arm to snap down to a second position. The instant pressure is released, the arm snaps back. Both make and break are clean and sharp; there's no in-between position.

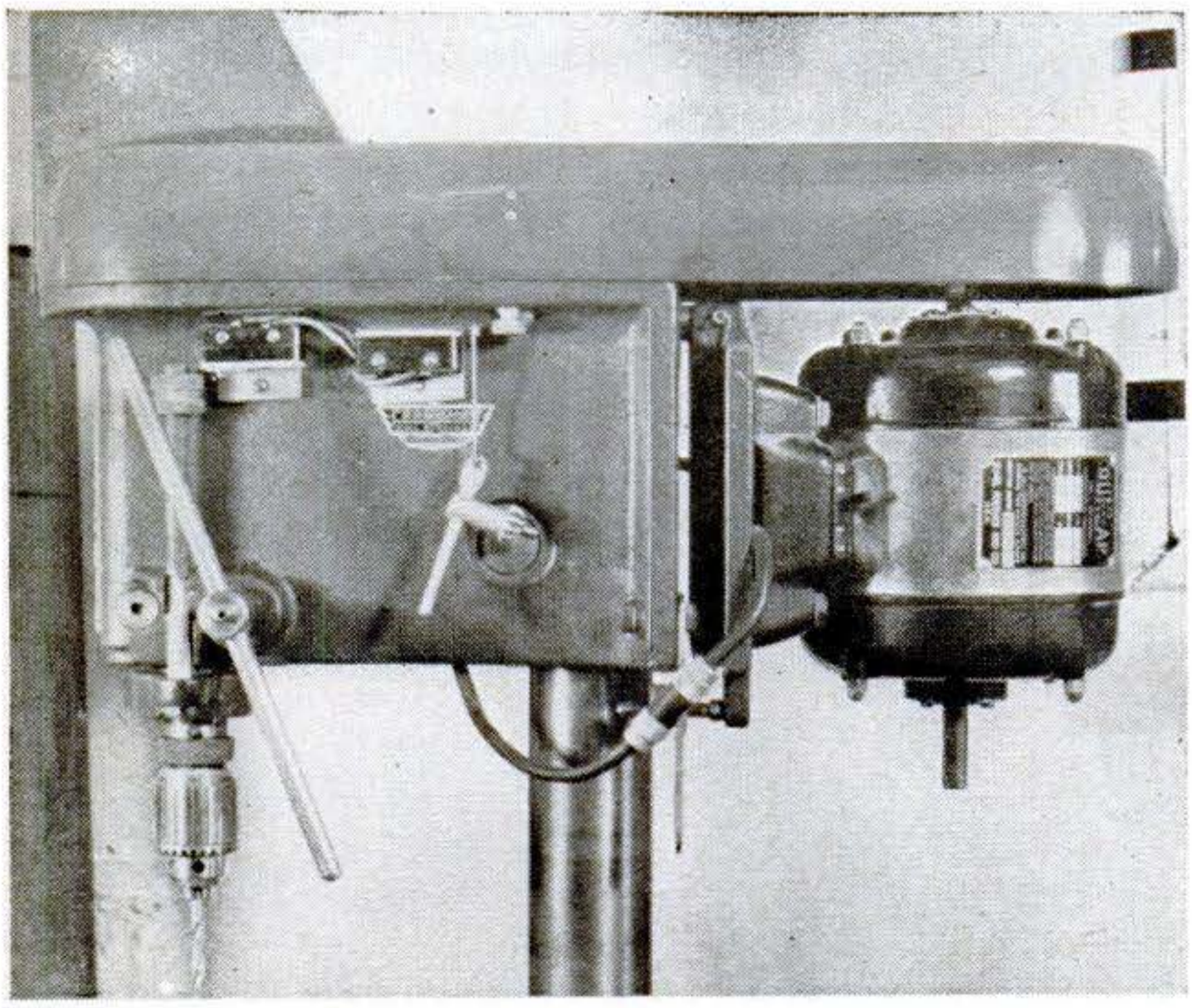
Most snap switches are of three types: normally open, normally closed, or single-pole double-throw. The "normally" designation describes the switch when no pressure is applied to its actuator—not necessarily the position in which the switch is usually left. To clear up the point, consider for a moment the switch controlling the light inside a refrigerator, which is a normally closed type, being held open when the door is shut. Note that in this application as in some others, a normally closed switch is habitually held in an open position.

If you aren't sure of the uses to which you are going to put the switches, it's smart to get the SPDT type. This is because they can be used as either normally open or normally closed ones, depending on which of the terminals you connect. One kind, shown at top right on page 193, can be connected to open and close two entirely separate circuits, or (with the lugs at one end connected together) employed as a SPDT switch.

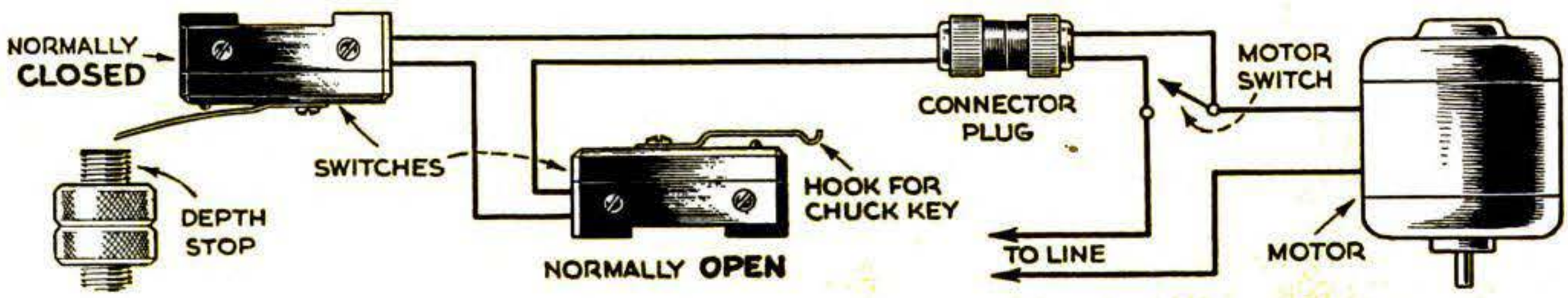
Actuating levers to press the plunger on the switch are made in a variety of styles, including simple and compound levers, springy leaves, and cam-following rollers. Since forcible overtravel of the plunger may damage the switch, be sure to use a lever that'll protect the switch in cases where the applied pressure may be large. Suppose you use a normally closed switch on the bed of a screw-cutting lathe, wiring it in series with the motor so that it will cut power at the end of the carriage travel. The momentum of the motor, jackshaft, and gears may be enough, however, to move the carriage a substantial fraction of an inch *after* the juice has been cut. Your remedy, naturally, is to use a switch having either a telescoping button over the plunger or a springy leaf.

Just a few of the ways these handy gadgets can be used are illustrated on these pages. Almost all of the applications can be adapted to suit your needs. For instance, the water-level alarm would serve as shown as a reminder to dump the pan beneath the icebox, or to shut off the windmill or pump filling a tank. If the switch were changed to a normally closed type, the setup could serve as a warning that the stock watering trough or cistern was running low.

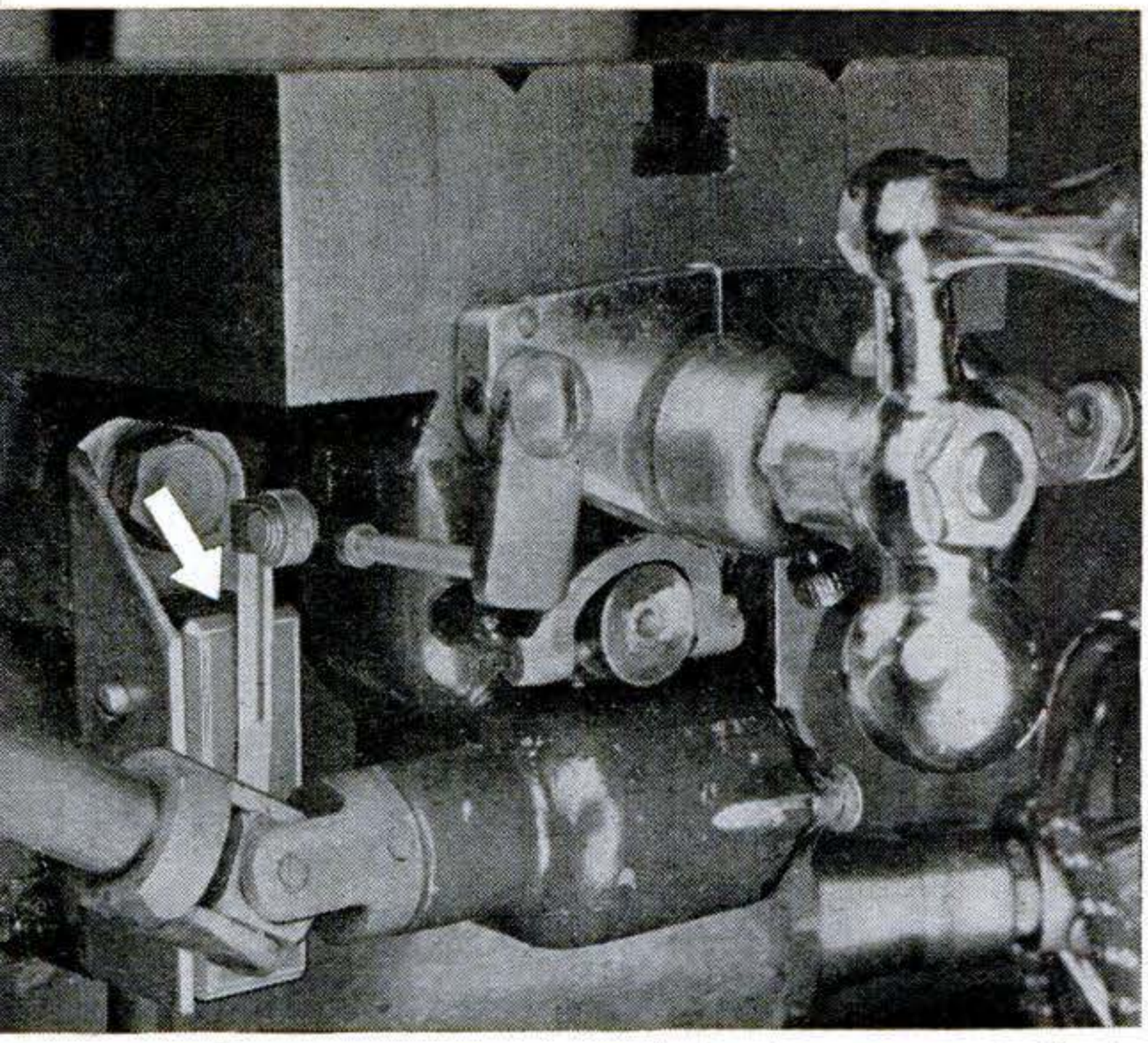
If occasion warrants it, a good deal of elaboration of these ideas is also possible. The automatic scale, for example, is handy for measuring a large number of identical quantities, and it signals when the specified weight has been poured on the scale. (Be sure to include the switch-tripping pressure in setting it to produce a particular amount.) As



For convenience and safety, H. L. Phillips, of Watertown, Mass., rigged a drill press this way. Moving the feed lever starts the motor—but only if the chuck key is hung up.



Copyrighted material



Damage to power tools having automatic feeds is made less likely with these switches. Here a normally closed switch is used on a bench mill to cut power at the end of table travel.

shown, the rig signals when a specified amount *or more* has been added; but it wouldn't be difficult to add a second switch and signal to show when the weight went above a second, upper limit.

The extreme precision and repeat reliability of snap switches were used in some war plants to make the electrical gauges shown schematically on page 193. A pair of switches checked each dimension, and several different dimensions were tested simultaneously. With an actuating movement of little more than .001", the gauges were accurate enough for many jobs.

One agreeable thing about the switches is that they're tailormade for duties that you want performed automatically. Consider for example the drill-press application shown here. If you've ever inadvertently left the chuck key in the chuck when the motor was switched on, you know that it can be slung out with dismaying violence. In this setup that *can't* happen; the motor just won't start until the key is hung up where it belongs. The other switch is more of a convenience than a safety measure, but starting the motor just by pulling down the feed lever will be appreciated by anyone who has groped for an awkwardly placed drill-press switch.

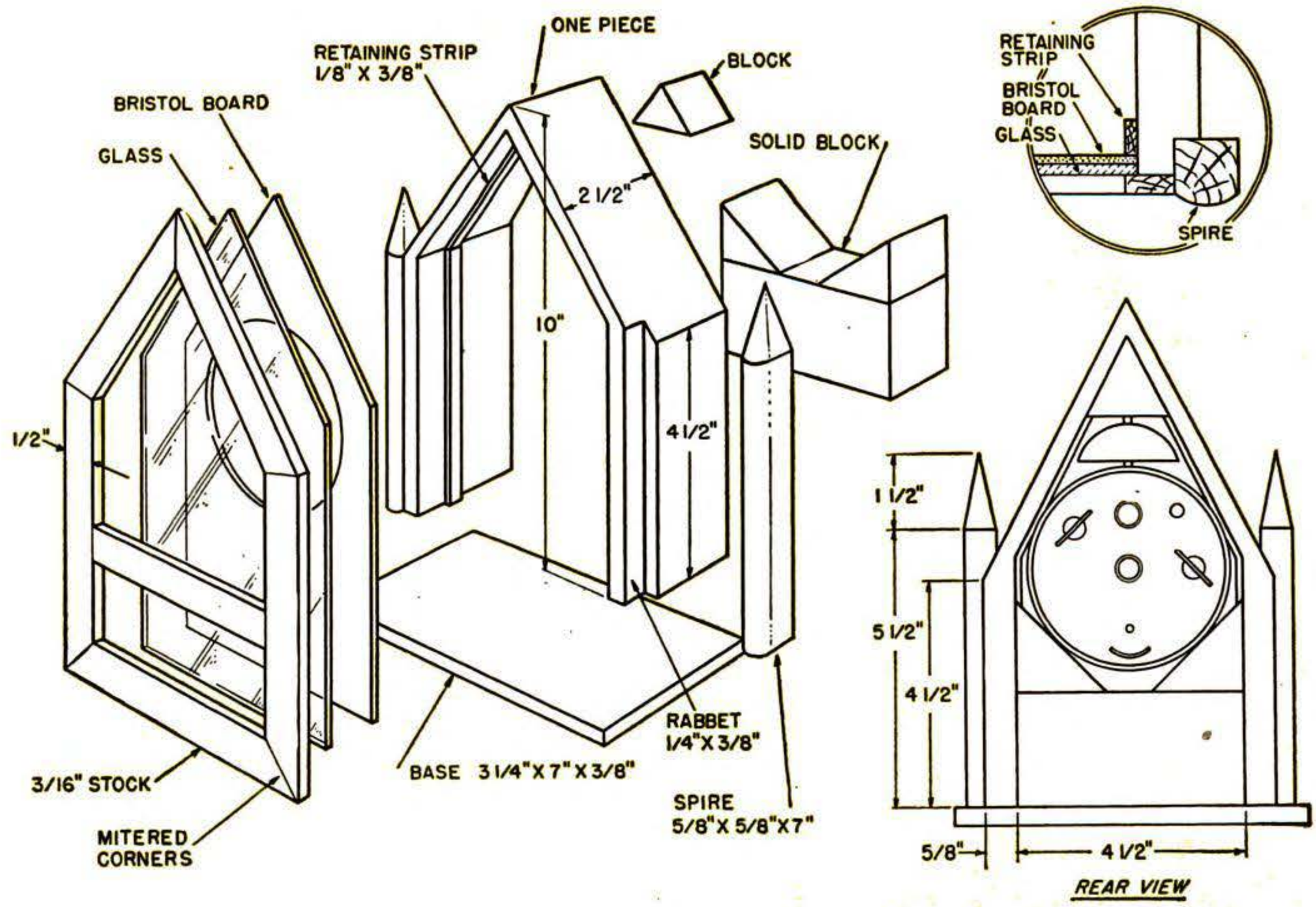
Many applications of snap switches will be suggested by your own activities. Thus the radio ham will use them on transmitter-cabinet doors to cut the primary of high-voltage transformers when the cabinet is opened. Or the truck operator will put them under the springs to signal overloads or on side or rear gates to tell if they aren't shut.

The photographer will find them particularly handy. With a few scraps of wood and a hinge, a snap switch becomes a foot switch that will make enlarging easier. A light in a hall outside the darkroom door won't fog valuable film, no matter who walks in inopportunely, if it's fed through a switch held shut by the darkroom door. A normally open switch attached to the paper storage box and connected to the white room light will protect photo paper.

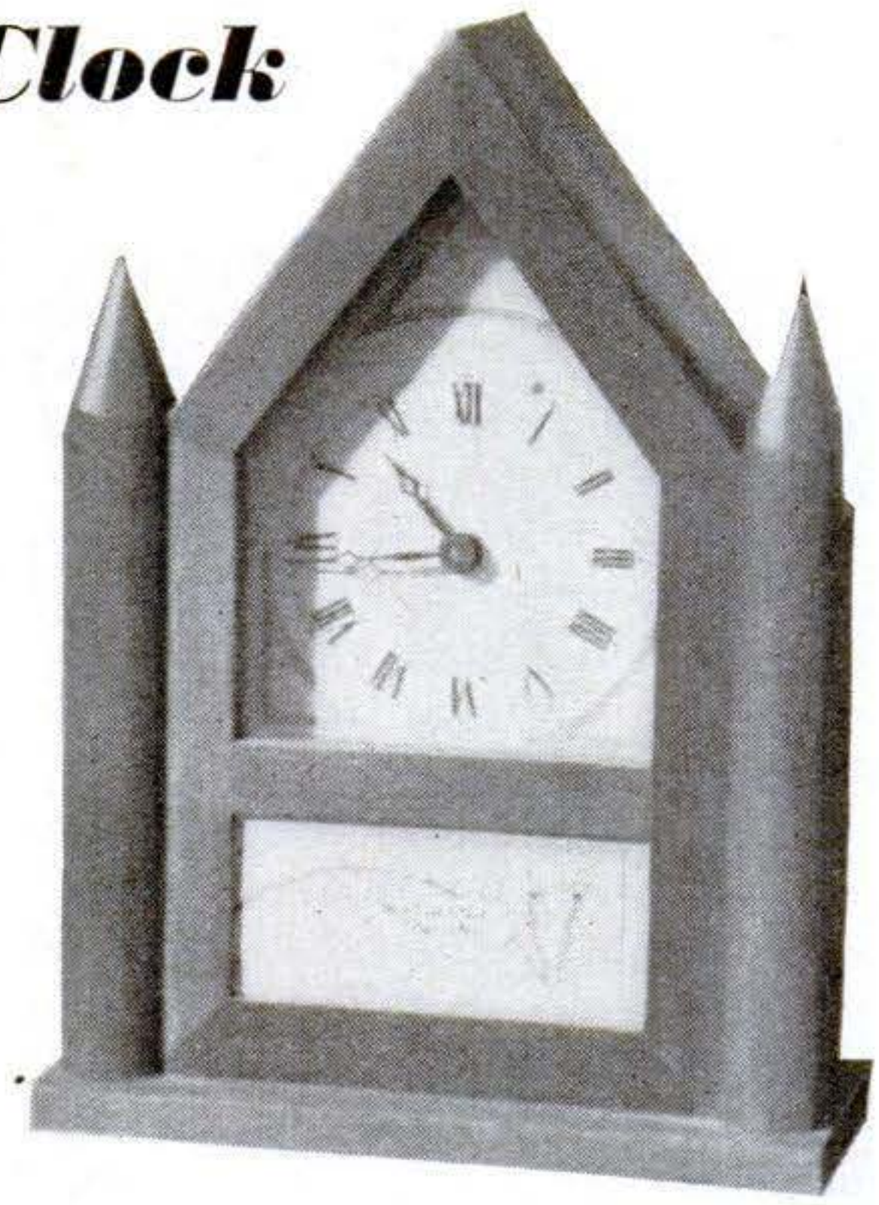
For the householder, they'll come in handy for an automatic closet light, using a normally closed type. Or for burglar-alarm systems, using normally closed switches that are held open by acceptable window or door positions, or by taut trip threads. Or for gate or mailbox signal devices. Or for home fire-alarm systems (normally closed switches held open by bits of low-melting-point wax might do the trick). Or for position indicators if you have to get a big car in a small garage. END

A push-to-talk control for an inexpensive microphone can be easily installed. Since it requires only very slight pressure, it can be kept shut for a long time without discomfort.

Copyrighted material



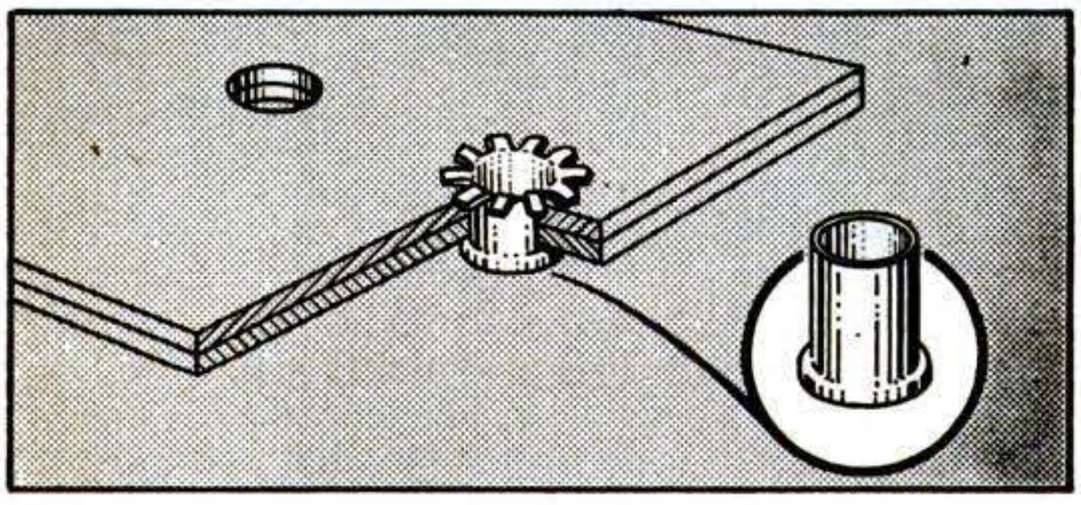
New Case Covers Old Clock



ENCASED in a cathedral-type housing like this, an ordinary alarm clock becomes an attractive mantel timepiece. Although the original is light maple with a natural finish, walnut, mahogany, birch, or cherry would be just as pleasing.

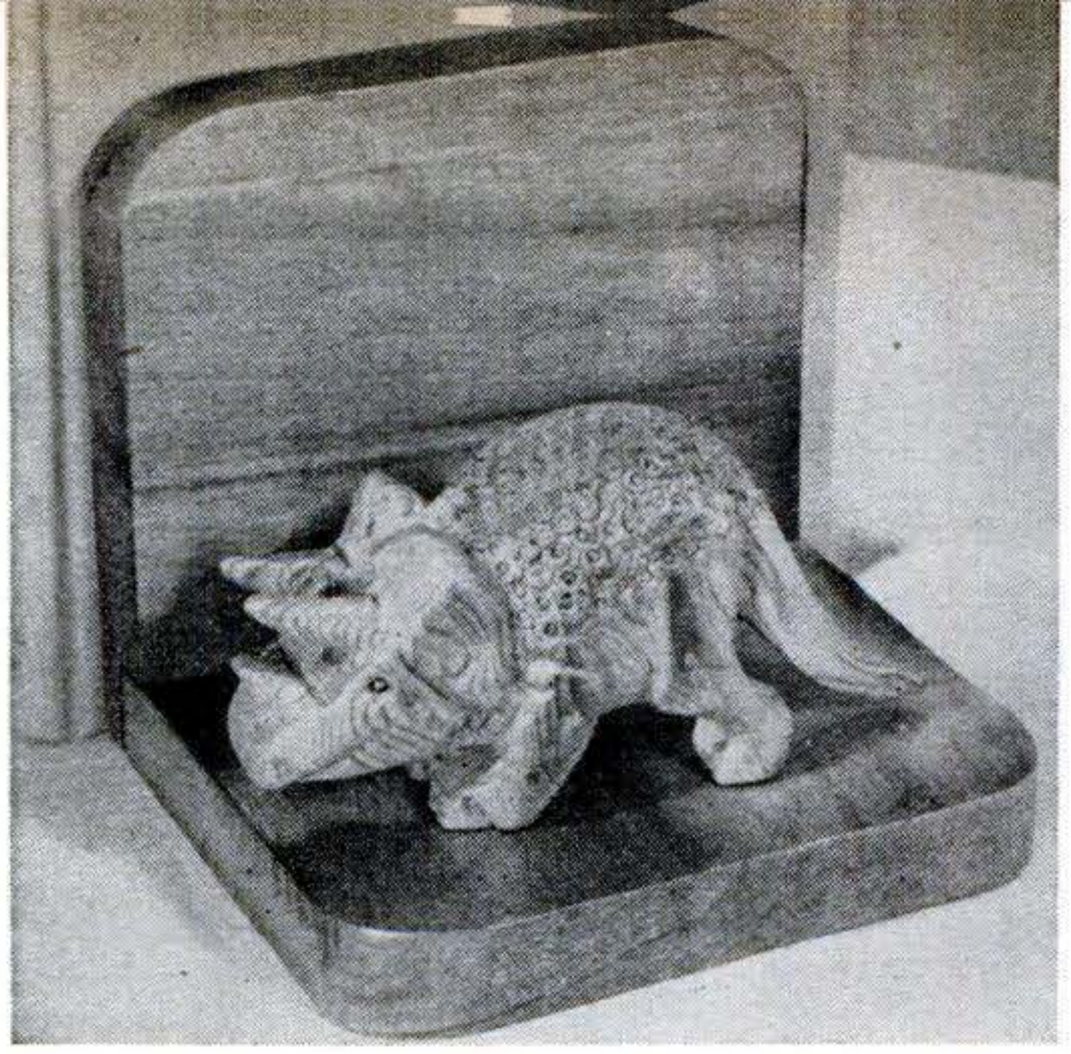
The main part is cut from a solid block, the outside being sawed to shape first and the corners rabbeted for the spires. Then with a jigsaw cut out the inside, making the walls ⅝" thick and the roof about ⅜". The frame for the face has mitered corners and is glued to the housing after the bottom is installed. Cut glass to a loose fit, put it in from the back, and secure with retaining strips. Also cut a Bristol-board mask, making the opening slightly smaller than the clock diameter. Decorate it with ink. The clock itself rests on blocks. Leave the back of the case open for winding up the clock.—*Hi Sibley, Nuevo, Calif.*

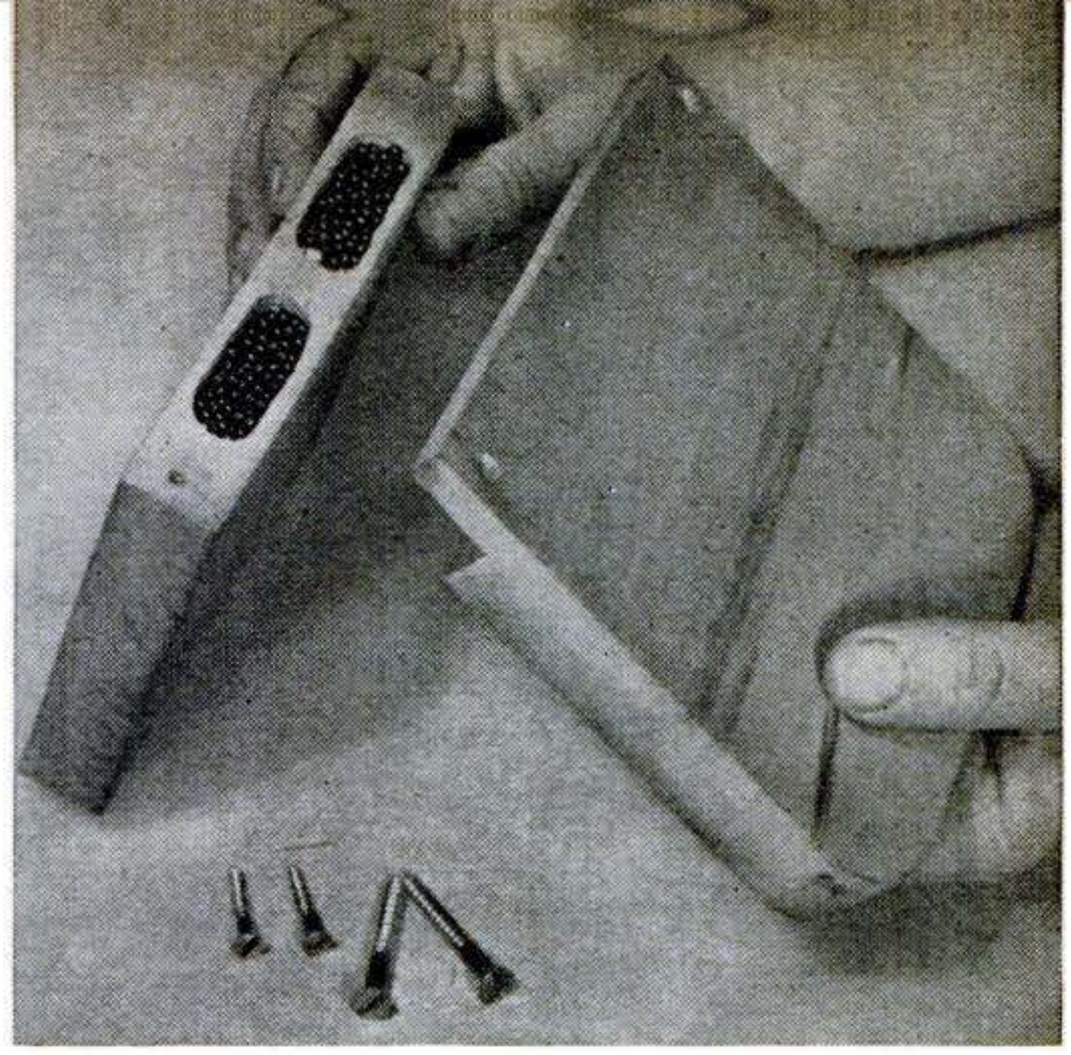
Empty Rifle Shells Rivet Sheet Metal or Wood



I USE empty .22 cal. shells with great success as hollow rivets to join sheet metal or light wood. The hole in the work must of course be a snug fit since the rim on the shell isn't much larger than the case. In joining thick pieces, use long-rifle shells. Shells of larger caliber could likewise be used.—*Walter Nelson, South Ozone Park, N. Y.*

Copyrighted material





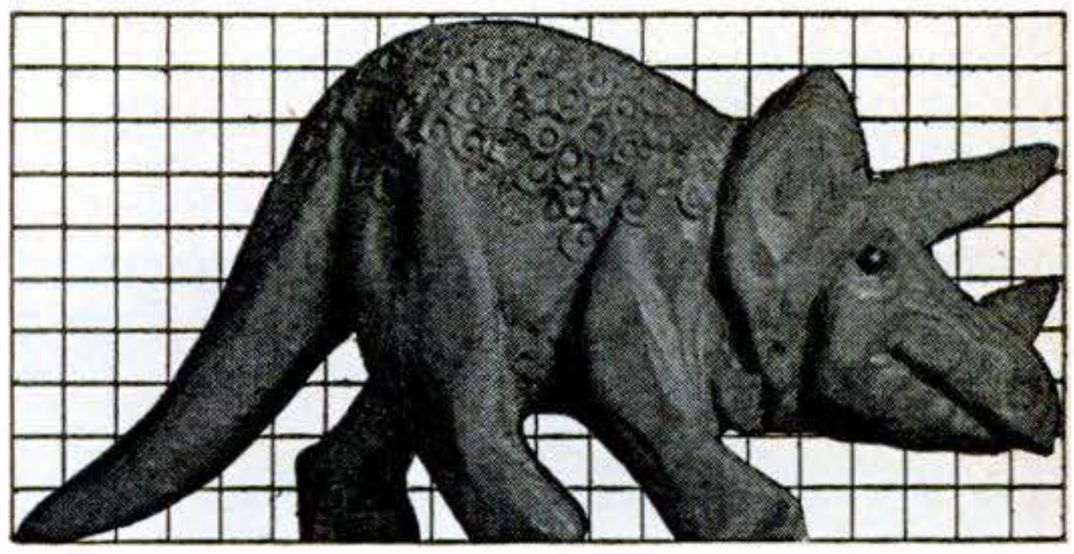
Carved Triceratops Adorn Bookends

BACK in the days of dinosaurs, you might have met a fearsome three-horned creature called a triceratops. Luckily for us, those huge animals are now extinct, but carved miniatures on a pair of bookends will bring them back in less alarming and more decorative form.

Lay out the profile on ¼″ squares and saw the figure from 2″ stock. Redwood is good for this because it carves easily and shellac brings out its pleasing natural color. However, almost any free-carving wood will do.

In carving the figure, remember that it has three horns, two above and a third centered on the nose below. Roundheaded nails or escutcheon pins may be used as eyes. The scaly hide on the back is formed by pressing a leather punch into the wood with a turning motion, slightly overlapping the rings, and then tapping a small nailset into the center of each ring.

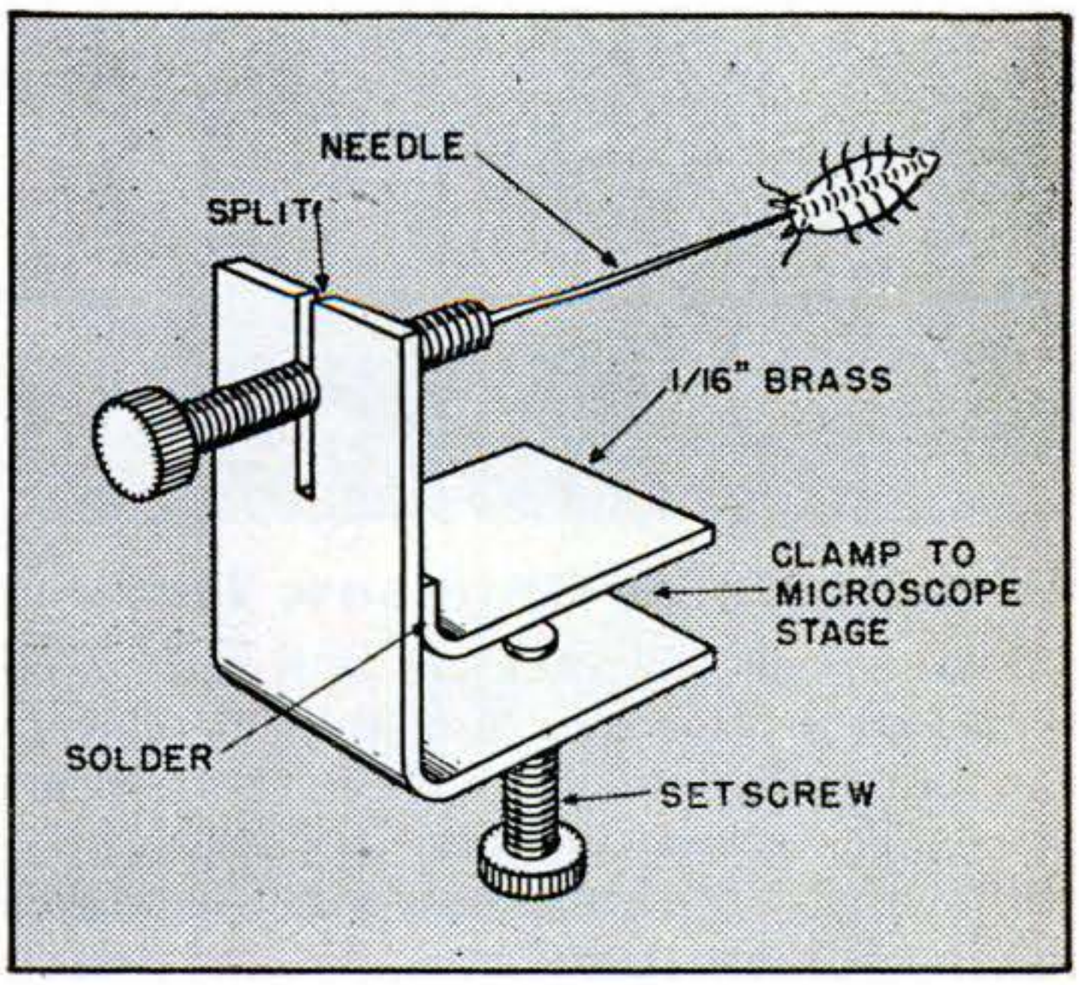
Cut the bookends from ¾″ stock, making the base 4¼″ by 5½″ and the upright 5″ by 5½″. In the lower edge of the upright, cut a ½″ by ¾″ rabbet so it will overlap the back edge of the base and retain lead shot poured into two recesses in the base as weighting material. Cut the recesses by making a series of holes with a ¼″ drill and then cleaning out the intervening wood. Attach the carvings by putting glue on the feet and running screws in from below.—*Elma Waltner, Hurley, S. D.*



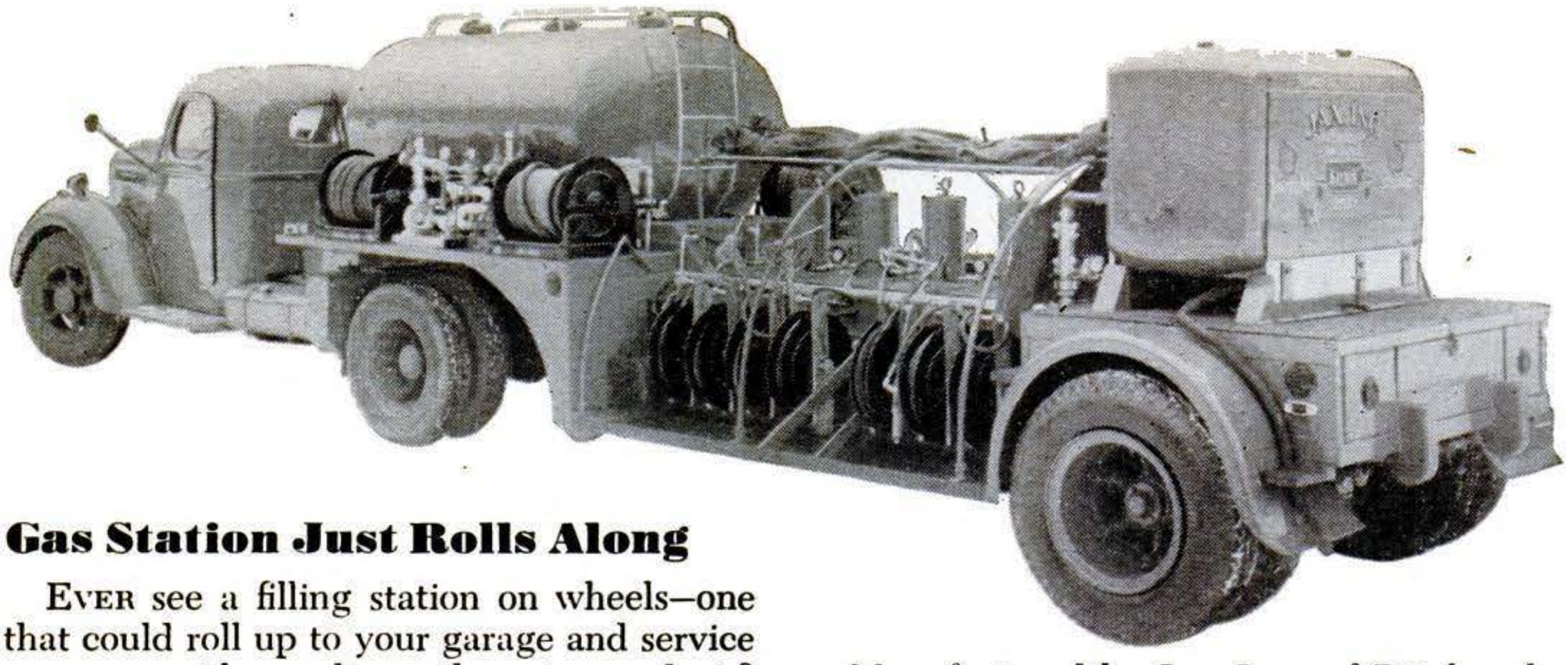
Insect Held Under Microscope

SMALL insects that are being examined under a low-power microscope usually are difficult to handle. This simple mechanism makes it easy to manipulate them.

Since microscopes vary in size, you must determine your own dimensions. Make the frame of brass at least 1/16″ thick. Anything thinner will not provide enough threads. After drilling and tapping a hole in the vertical piece, split it with a jeweler's saw, and pinch the piece together in a vise. This will cause enough tension to keep the screw in any desired position. Solder a needle in a hole drilled in the screw.—*Raymond F. Yates, Lockport, N. Y.*



Copyrighted material



Gas Station Just Rolls Along

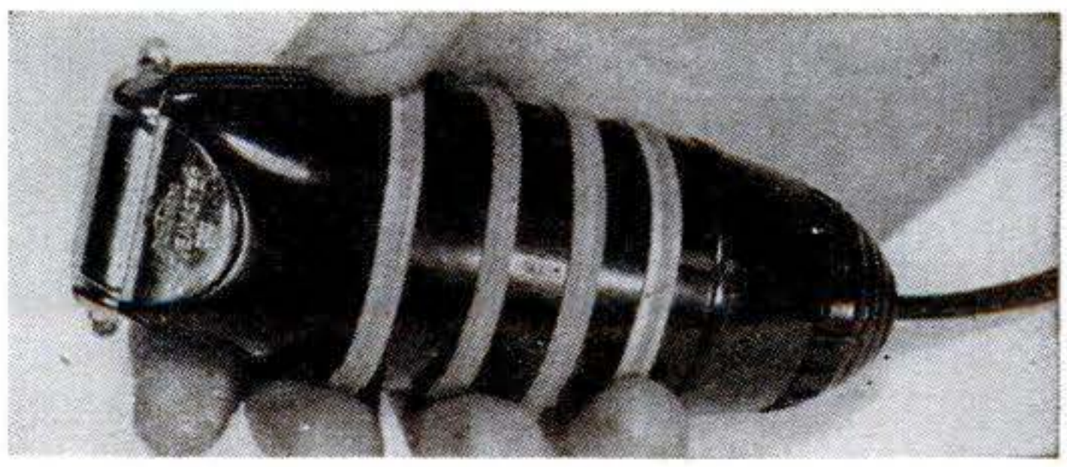
EVER see a filling station on wheels—one that could roll up to your garage and service your car with gasoline, oil, water, and air? Well, take a look above.

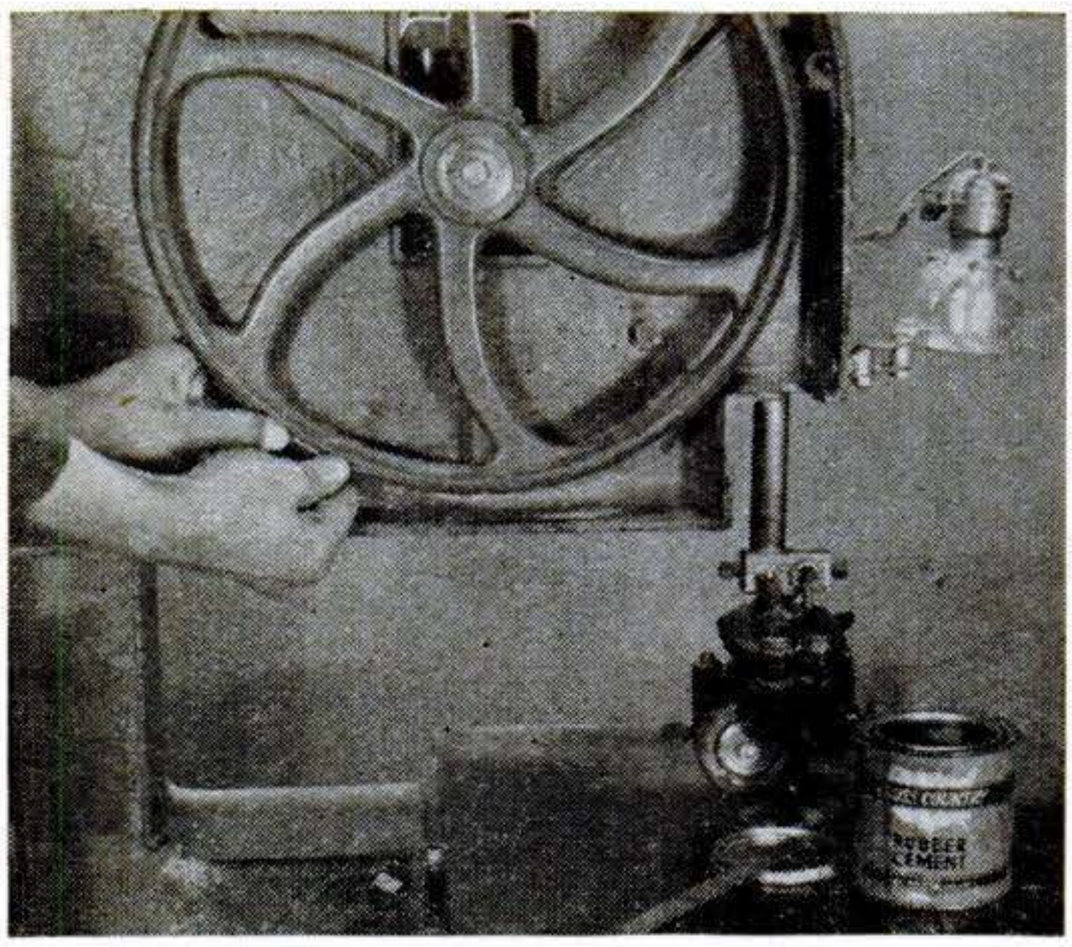
Although this 21′ machine could do all these things for your personal benefit, it's designed primarily for servicing heavy construction machinery and airplanes. It may also serve as a means of pretesting sites for permanent service stations.

Manufactured by Jax, Inc., of Pittsburgh, the mobile unit carries 700 gal. of gasoline and Diesel fuel, 200 gal. of various oils and greases, 60 gal. of water or antifreeze, quantities of kerosene, and compressed air for tires and other uses. It may be hauled by any tractor truck and is quickly coupled or uncoupled.

Bands Form Grip for Shaver

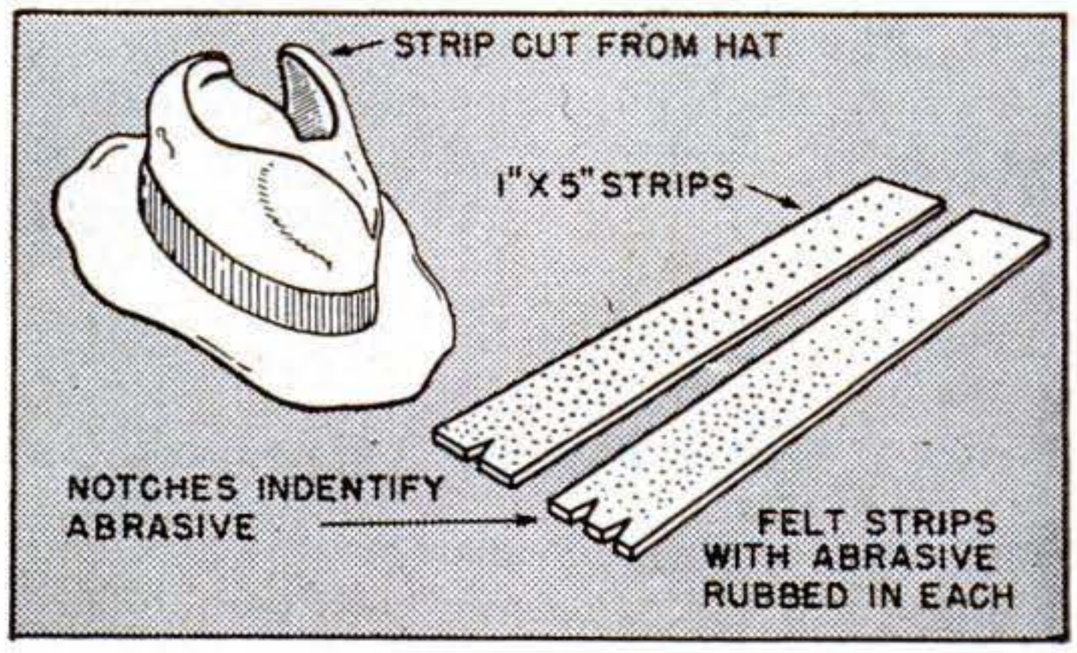
SEVERAL wide rubber bands slipped over the barrel of an electric shaver will give you a better grip on it. The bands also act as a cushion and prevent the shaver from moving around when it is put down on a hard, flat surface.—*R. Hanscom, Elmhurst, Ill.*





Cement Holds Bandsaw Tires

WHEN bandsaw tires are replaced or if they loosen after long use, rubber cement can be applied to keep them securely in place. The cement does not become brittle with age and it permits easy removal of the tire if this is ever necessary.



Polishing Strips Cut from Hat

A FEW strips cut from a felt hat that has outlived its usefulness are very handy for polishing work revolved in a lathe or drill press. I find them most convenient if cut about 1″ wide and 5″ long. Rub a different grade of grinding or polishing compound into the various strips and mark them for identification by cutting notches in the end. Store a supply of them in a drawer near the lathe or drill press and they'll be quickly available.—*Ivan Baxter, Hartland, Wis.*

Copyrighted material

What's Your Ingenuity Quotient?

The sweeps winnings in our shop are bolts, nuts, nails, and the like salvaged from shavings and other floor litter. The stuff wouldn't be worth separating by hand, but it's easy to sweep up everything and dump it in a bucket of water. When the water is poured out, shavings and dirt go with it but metal remains. Better than a magnet, this gets brass, aluminum, and copper as well as iron and steel.—*John Krill, No. Lima, Ohio.*

Here's how we kept a card game going even after a power-line failure made our living room blacker than the ace of spades. So that we could tell a deuce from a king, we improvised half a dozen "candles" from whiskey jiggers, cardboard, cooking oil, and string. Any kitchen oil will do.—*Thomas Spall-Etta, Bellerose, N. Y.*

It's a shocking business to polish cars because the fast-spinning buffer builds up a static charge on the metal body. The busy electrons are so anxious to get home that they'll use you as a path to ground unless you give 'em a better one. How? By standing an iron bar against the bumper as shown so that the charge can leak off as rapidly as the polisher puts it on.—*Russell L. Card, Tweed, Ont., Canada.*

A little reflection solved the problem of keeping tabs on our frozen-food cabinet. Being too large for the kitchen or basement, the freezer was put out in the garage. But the signal light that goes out when the temperature rises to the danger point must be visible at all times. An auto rear-view mirror does the trick. Properly placed, it deflects the rays into the house. The light is so accurately focused that it can't be seen from the street but is visible indoors day or night.—*Fay O. Wood, Elkhart, Ind.*

Have you pulled off a smart one lately? We will pay for acceptable contributions showing ingenious solutions of problems in the home, shop, garage, or camp. It doesn't matter if it's wacky—if it works.

Copyrighted material

How Cape Codders Build the Flat-Bottom Skiff

The salt-water men who know how to handle these sturdy boats can also show you the right way to build them.

By Elon Jessup

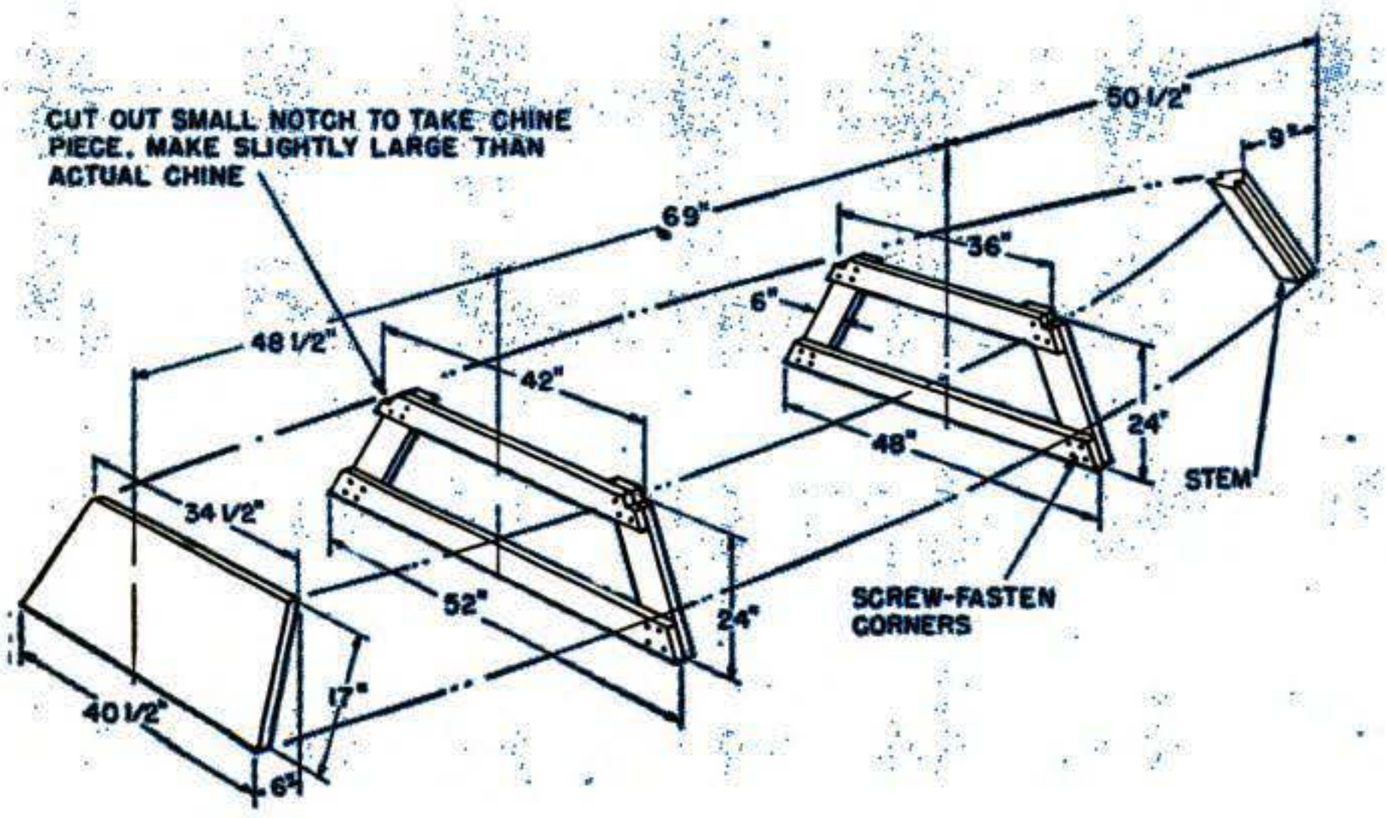
MANY people build small boats, both along the sea coasts and inland waterways. Some are good—and some not. On Cape Cod, the elbow-shaped strip of Massachusetts that juts out into the Atlantic, small boats are a part of our everyday lives, and those of us who live there believe the ones we build usually stack up with the best.

Take this flat-bottom skiff. A pretty ordinary looking affair, you may say. Sure. But it got that way because every part of its design has been tested, over and over again. Measuring 14′, it's sturdy without being heavy. The cedar sides are ½″ thick; 13 frames cut from ⅞″ by 1½″ oak and spaced along each side give it additional strength. It's a good small boat, anyway you look at it and wherever you want to use it.

Two temporary wood molds are required. Each consists of uprights and crosspieces cut from rough stock about 6″ wide. It's around these that you build your boat and, once made, they may be used for as many boats as you wish.

If you're working from a set of plans, dimensions of the molds will be given. But suppose you want to duplicate a skiff you've seen along the waterfront. In that case, just take along your stock and build the molds directly against the inside of the bottom and sides of the actual boat. Also make transom measurements of the boat you are copying. Mold and transom measurements suitable for this particular skiff are given in the drawing below. Note that notches are cut in two corners of each mold so that they'll clear the chines. The stem requires a careful bit of work. Saw it first to the cross section of a triangle with a 4″ dimension on each side. Then cut a ⅞″ by 1½″ rabbet at two opposite corners. These take the side planks. Make the stem a bit longer than the finished length so you can butt the first bottom plank against it.

With the forms, transom, and stem in hand, you're ready to start construction. But first a firm building platform should

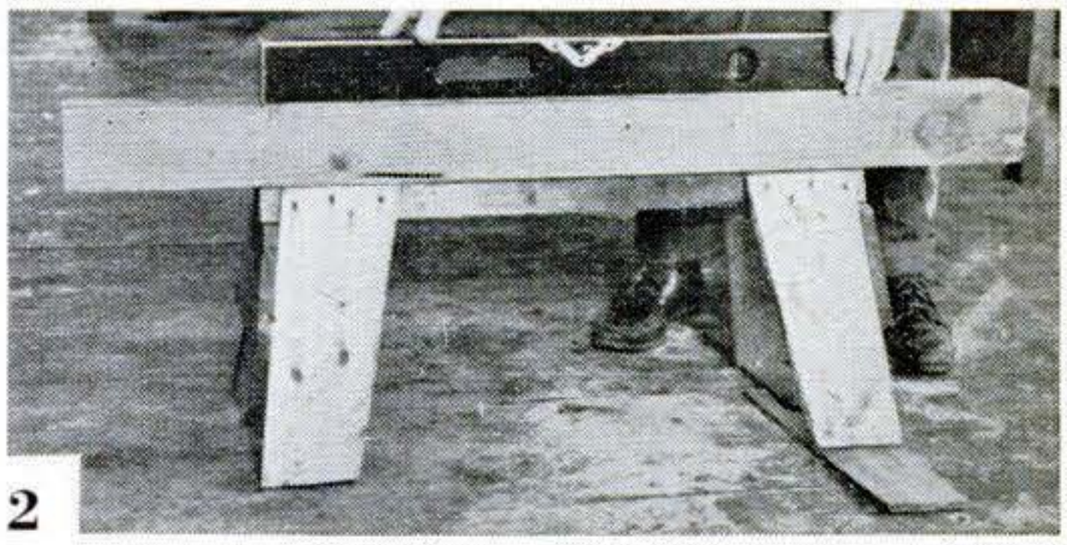


Copyrighted material

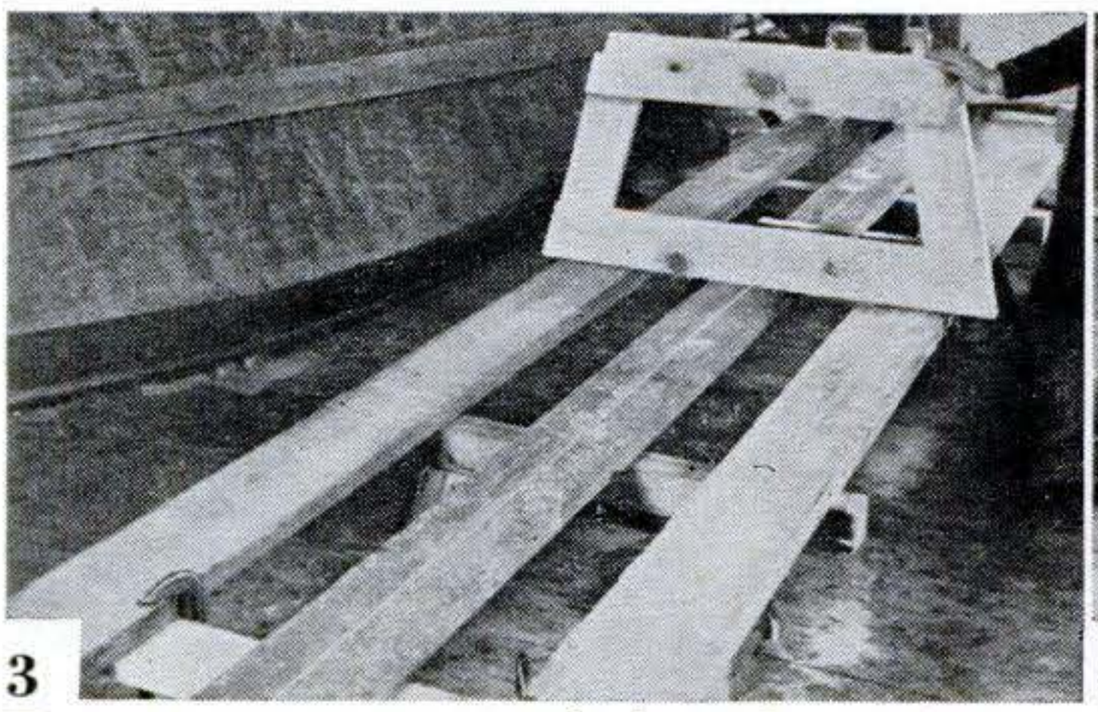
be assembled. A pair of low sawhorses with three long planks across them will do nicely.

From here on, the photos tell most of the story. There are several helpful points not mentioned, however. Ordinary 1½″ galvanized wood screws were used to fasten the side planks to the transom and stem, and the same for the frames. Hold the head of the stem firmly in place with small blocks nailed to the platform. Also nail two or three battens to the other end, attaching these to an overhead beam or similar bracing. Before installing the side planking, plane the touching edges to a perfect joint. Long boat clamps are best for pulling the sides against the transom. If you don't have these, you could tie a heavy rope around the sides, winding a metal rod through a loop in the rope. The chines are simply butted against the cleats screwed inside the transom. For best appearance, taper frames to about ½″.

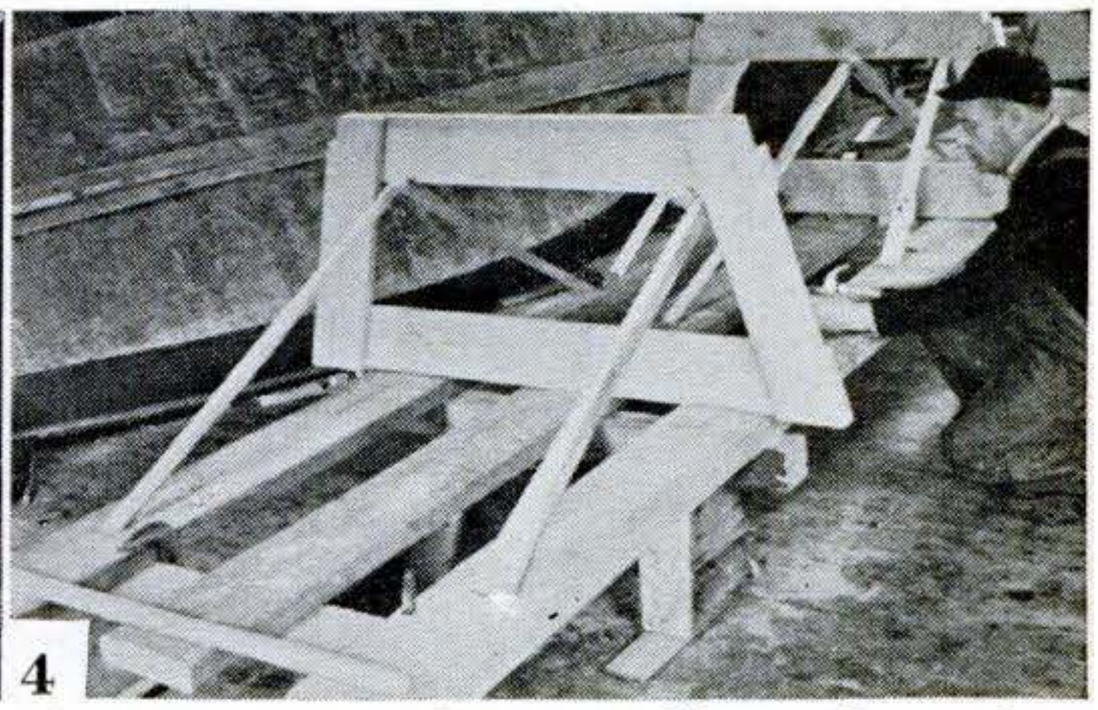
1 **A small skiff** you happen to like may be duplicated by building a pair of molds against the inside of its sides and bottom. Measure the distance from the stem to the two molds so you can locate them in the same spot in your boat.



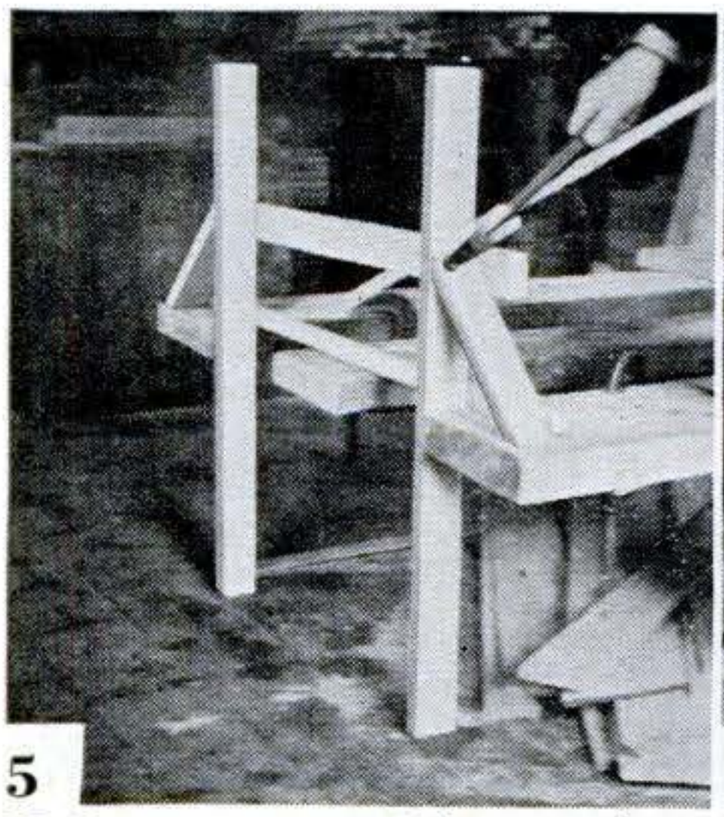
2 **Level two sawhorses** as a working base when molds and transom are finished. Shim the legs with shingles if necessary. After the horses are level, nail each leg to the shop floor.



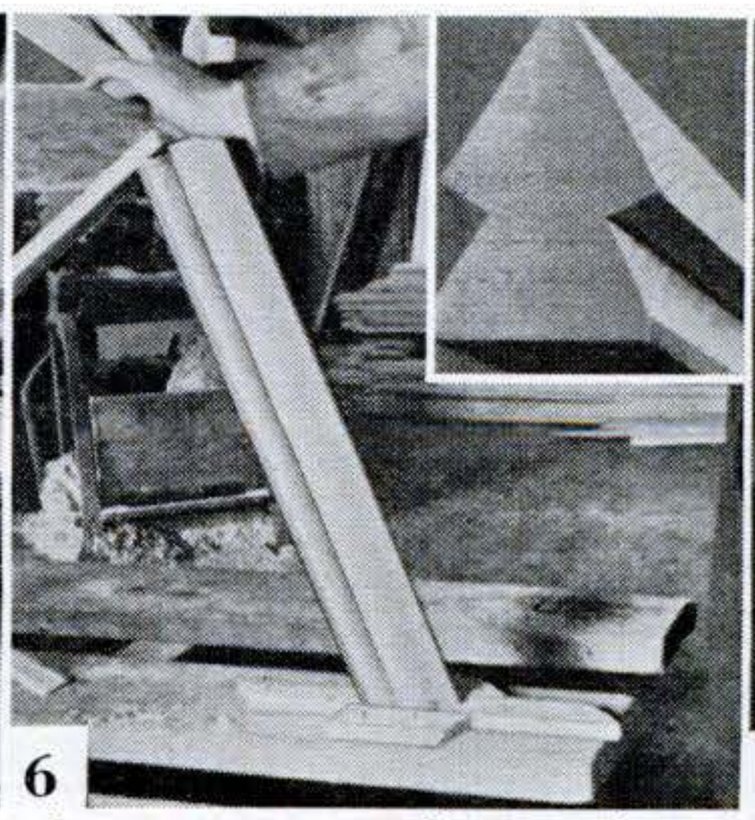
3 **Three heavy planks** spiked to the sawhorses serve as your building platform. Snap a chalk line down the center of the middle plank as a center line. Then position the two molds.



4 **Brace and nail** the two molds rigidly in place. For building convenience, it's a good idea to locate the molds so the end of the platform and the stern of the boat will coincide.



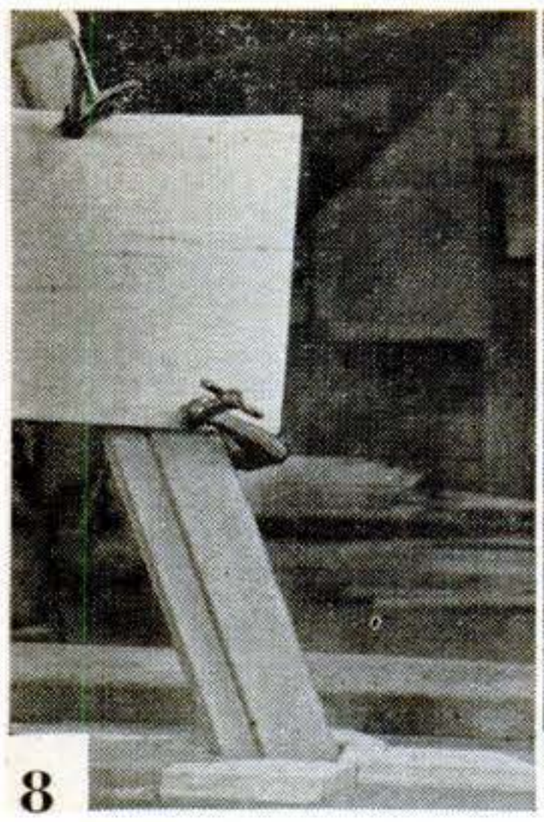
5 **Nail on two uprights** at this end as a means of bracing the transom when you're ready to put the latter in place later. Make the stem from a piece of oak, first cutting it to a triangular section and finally rabbeting two corners as seen in the inset photo above.



6

7 **Set up the stem** at the location you've already marked for it along the center line and tilt it to the desired angle. Bear in mind you are building the boat bottom up and that the top of the stem goes down. Brace the stem as in the two photos above. Note brace to the ceiling.

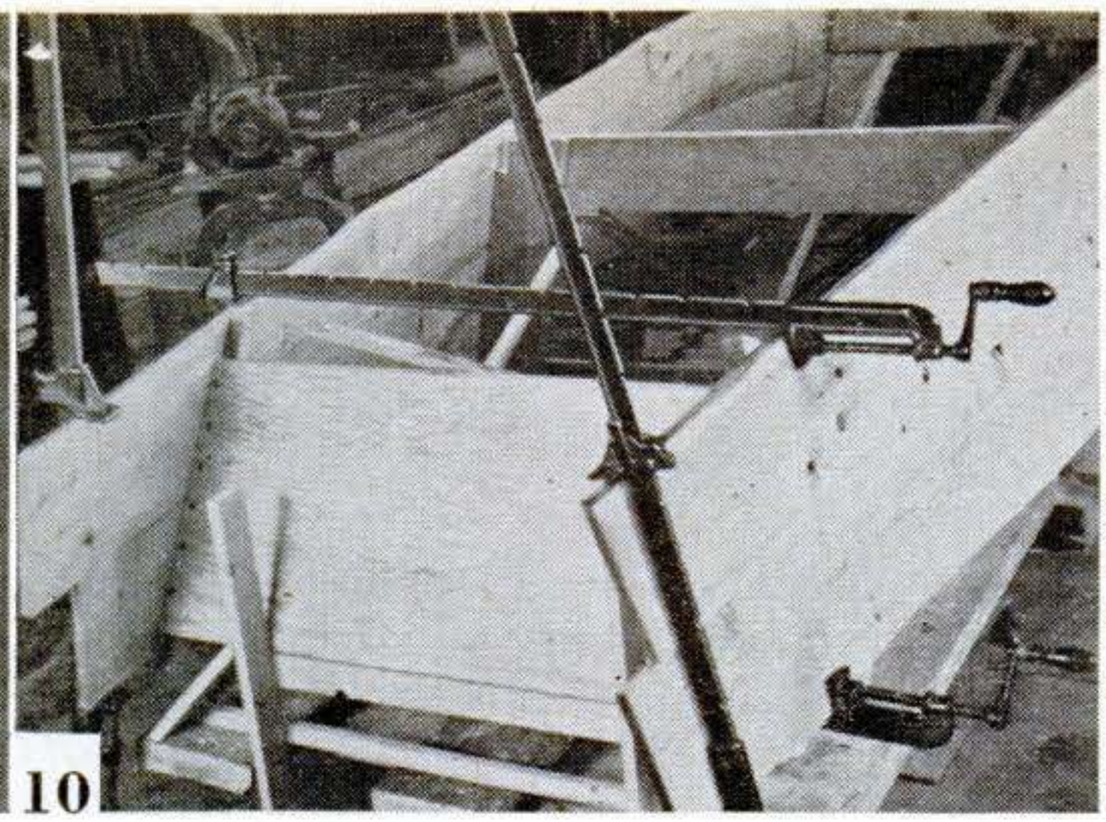
Copyrighted material



8

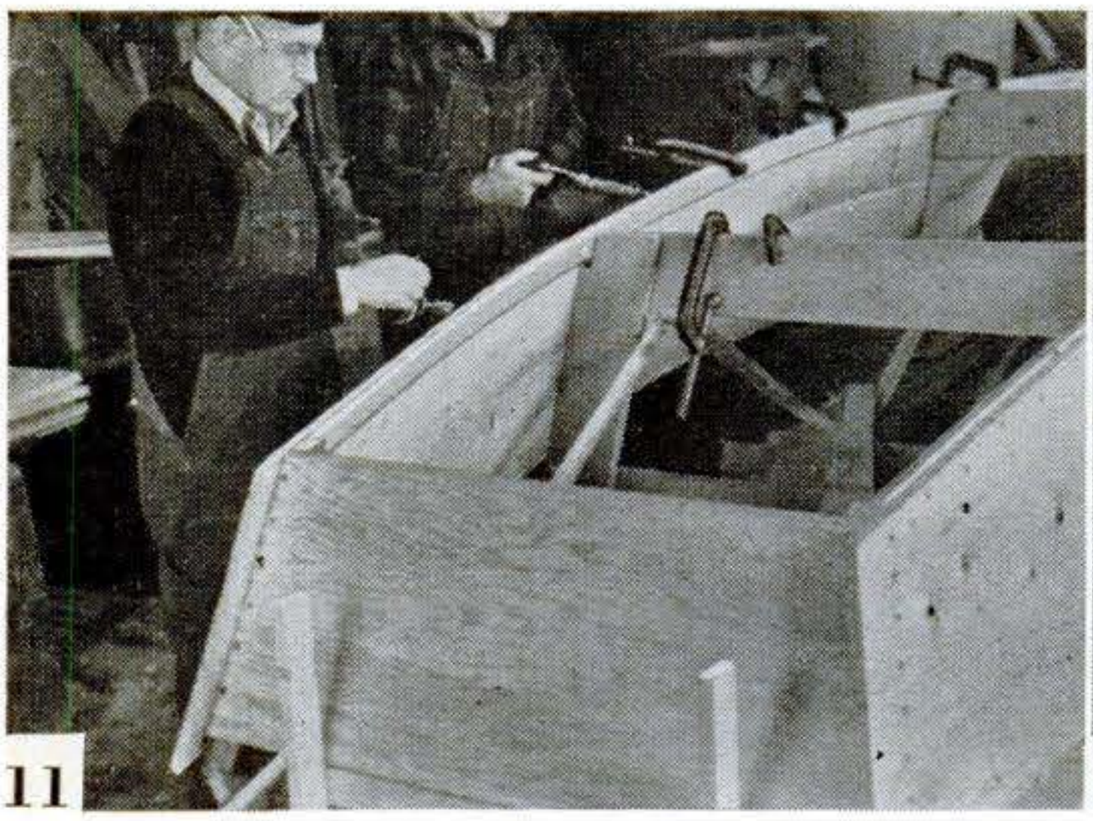
9

Mark and saw the sides to fit into the rabbet in the stem, drill half a dozen holes in each, and screw to the stem. Working aft, press each plank in succession against the molds and fasten in with screws. Later they'll be removed and the holes plugged. Now for the stern.



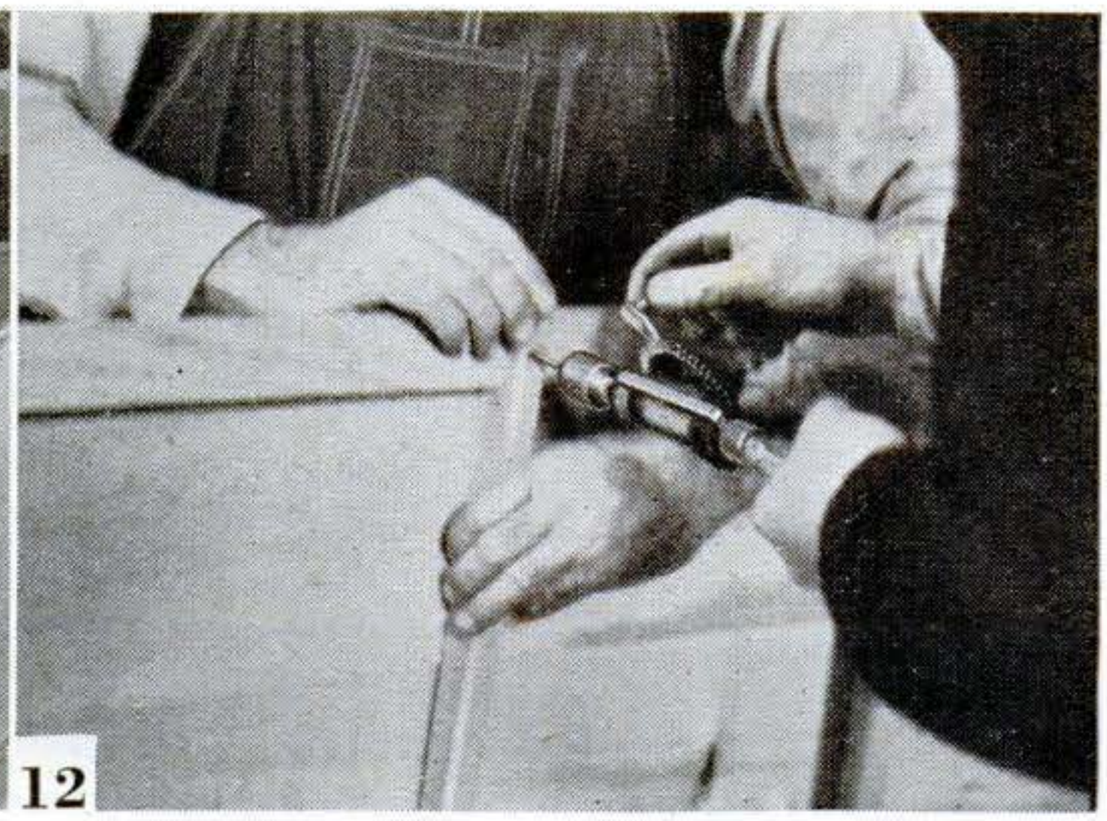
10

Draw up the planks against the transom with clamps, bracing the transom against the two uprights previously installed and tilting to the desired angle. Fasten the sides by running screws into 1″ by 1″ oak strips that you have screwed to the transom flush with each end.



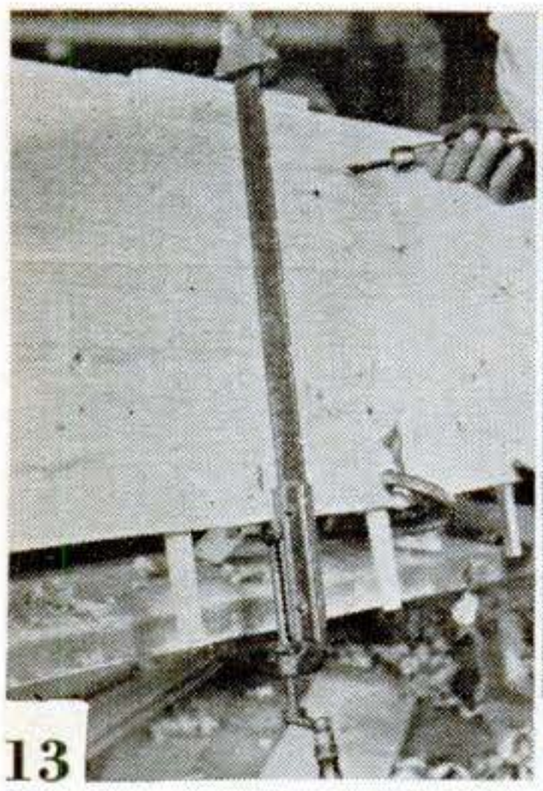
11

The chines are put in next—after the sides have been rigidly fastened at all points. These should be strips of ¾″ by 1½″ oak long enough to run from stem to stern at the inner junction of the bottom and sides. Screw-fasten them, and plane down the bottom edges of the sides.

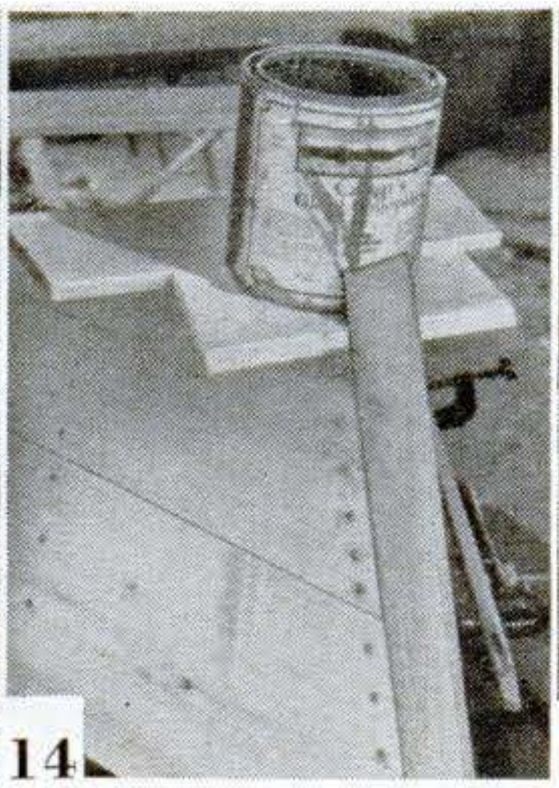


12

All of the frames are notched at one end so they will fit over the chine. Working from inside the boat, turn a screw through the notch area into the chine. Made from ⅞″ by 1½″ oak, the frame pieces at first are cut only roughly to length. Saw off the ends after installing.

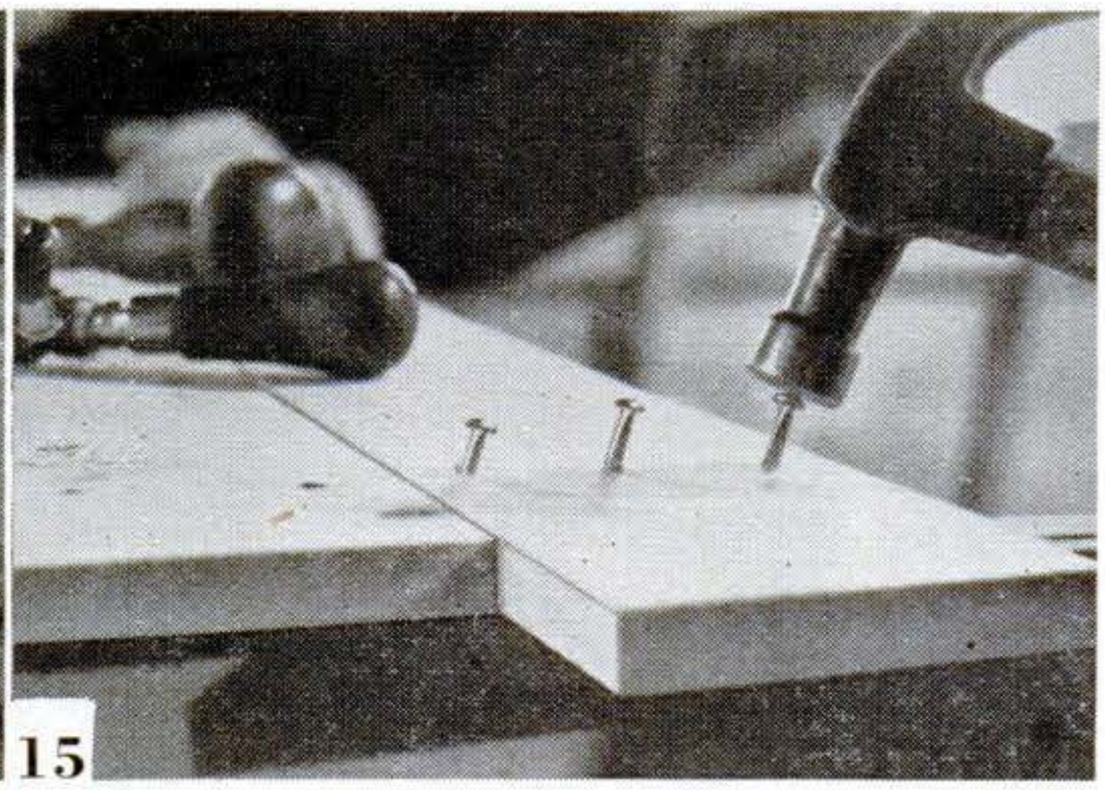


13



14

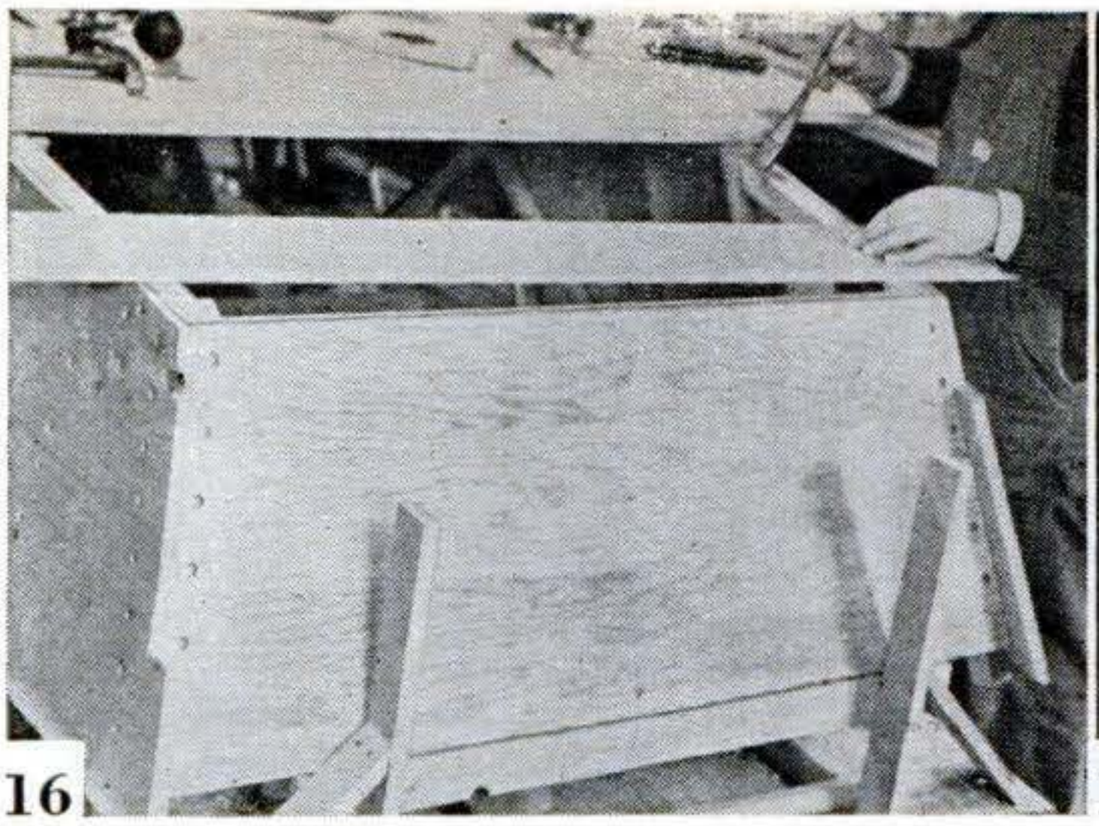
Compress the side planks together with long boat clamps and insert half a dozen screws in each frame piece from the outside to make the construction solid. Countersink all the screw heads. You're now ready to plank the bottom. Put the first piece against the stem as above.



15

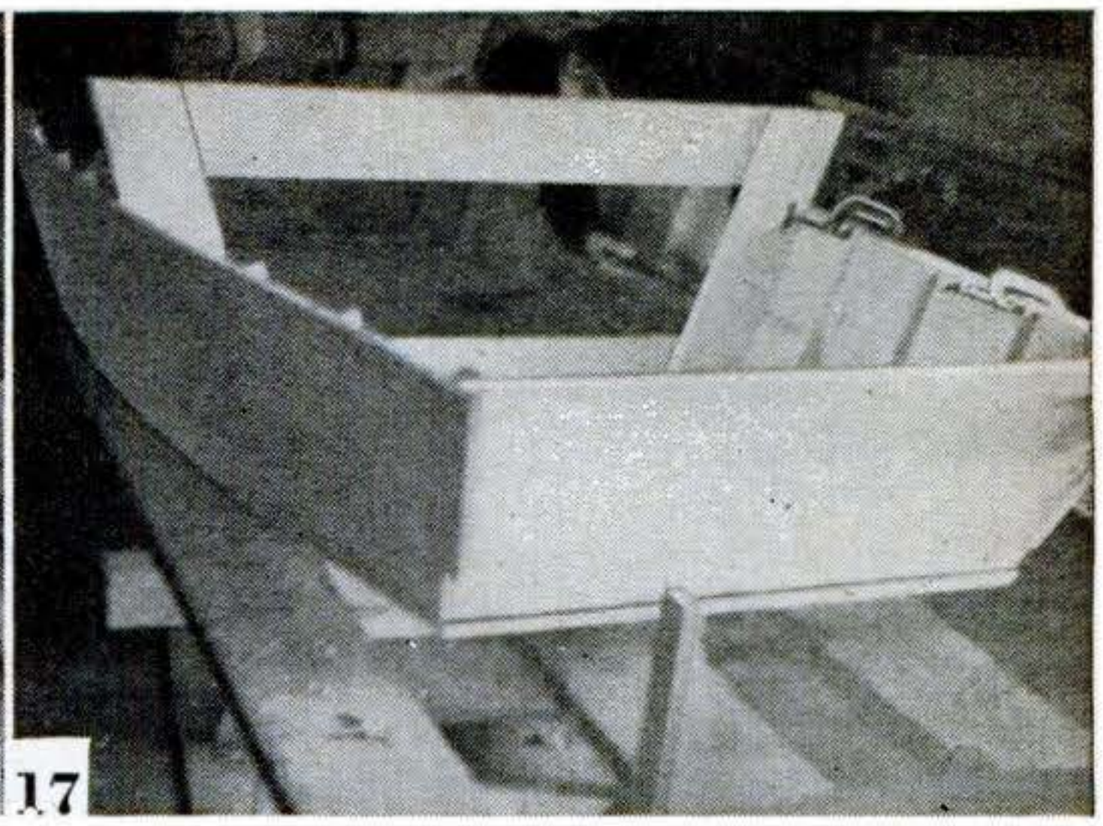
Angle the nails in this way, forcing each plank snugly against the preceding one, as you apply the skiff bottom. Throughout the job, keep a can of paint at hand, as in the center photo above, and remember to coat any edge or area that will be hidden.

Copyrighted material



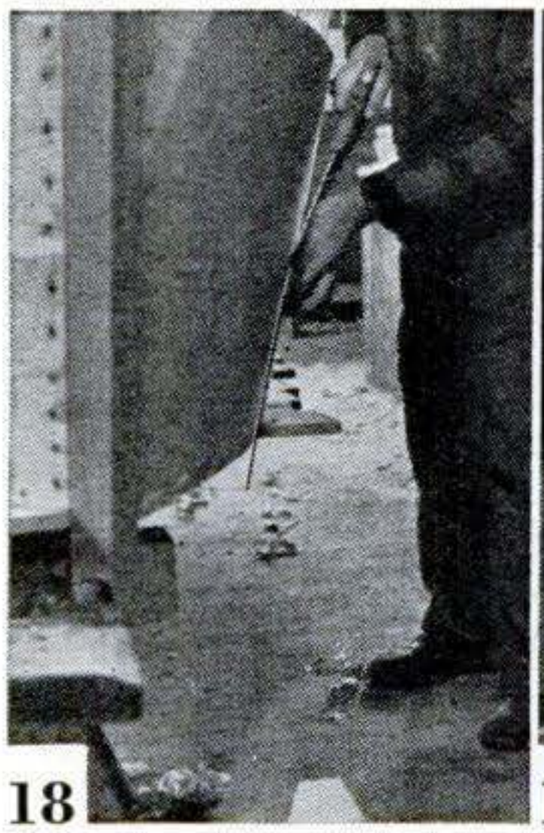
16

Work toward the transom, alternately applying paint and nailing a plank. Use galvanized boat nails for this and drill a hole for each into the oak chines. As you put down the last plank or two, you'll see whether the first one at the stem was placed square across the boat.

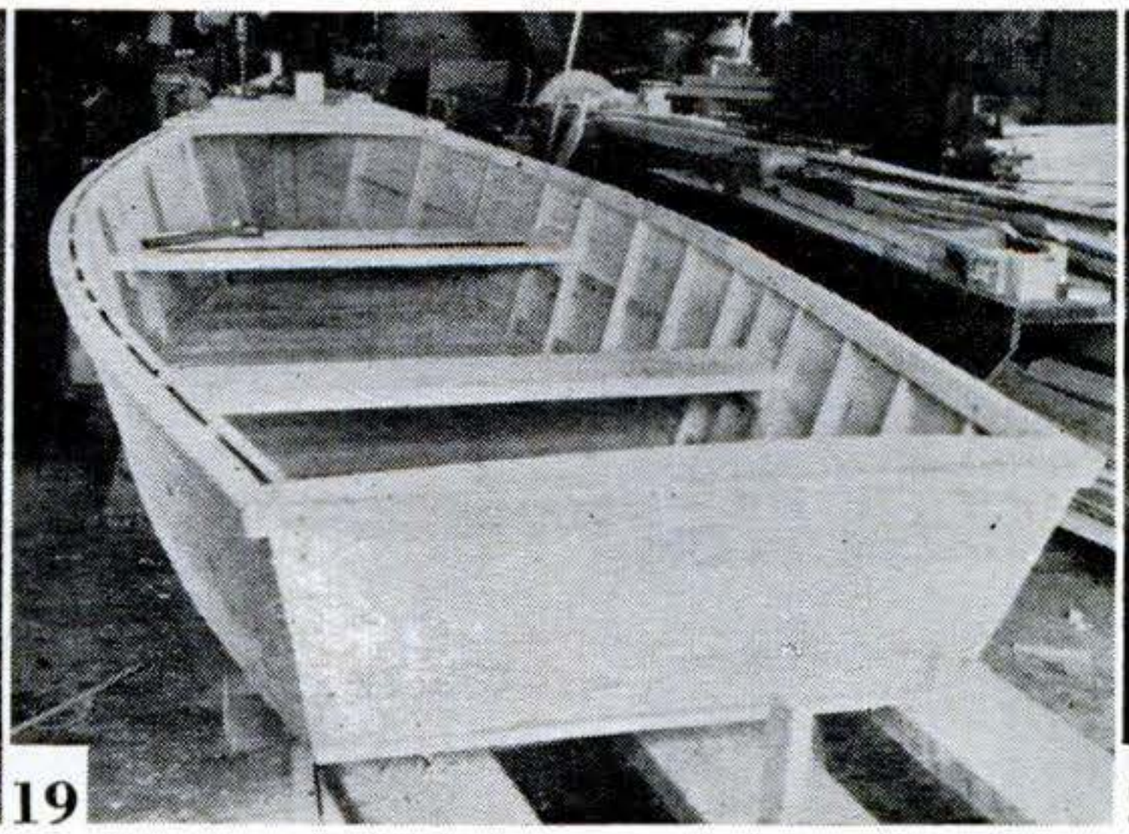


17

Now turn the boat right side up and remove the molds, for their job is now done—at least as far as this boat is concerned. Decide where you want seats, cut them to size, and install by means of cleats. A cleat straddling adjoining frames is usually the best method.



18

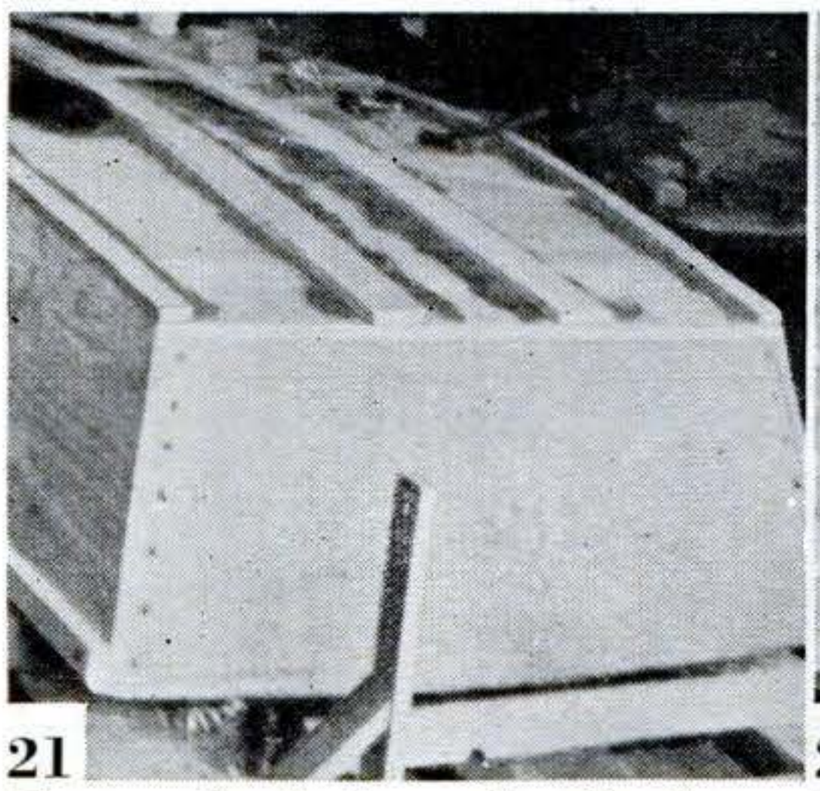


19

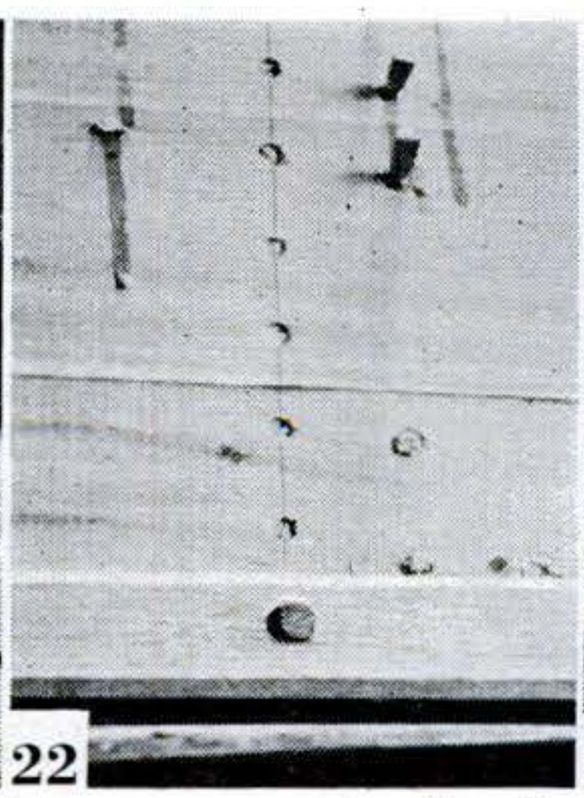
Saw off projecting pieces flush—and the boat will begin to assume finished form. Spring in an oak inwale from stem to stern on each side and screw to the frames, attach oak guard rails outside, and place a triangle of waterproof-plywood decking on the bow section.

20

Again the boat is turned upside down, this time for calking the bottom seams. Use cotton wicking and work it in with a calking wheel. After the calking has been finished, cut and fasten oak rub planks to the bottom, first applying paint to all surfaces that will be hidden.

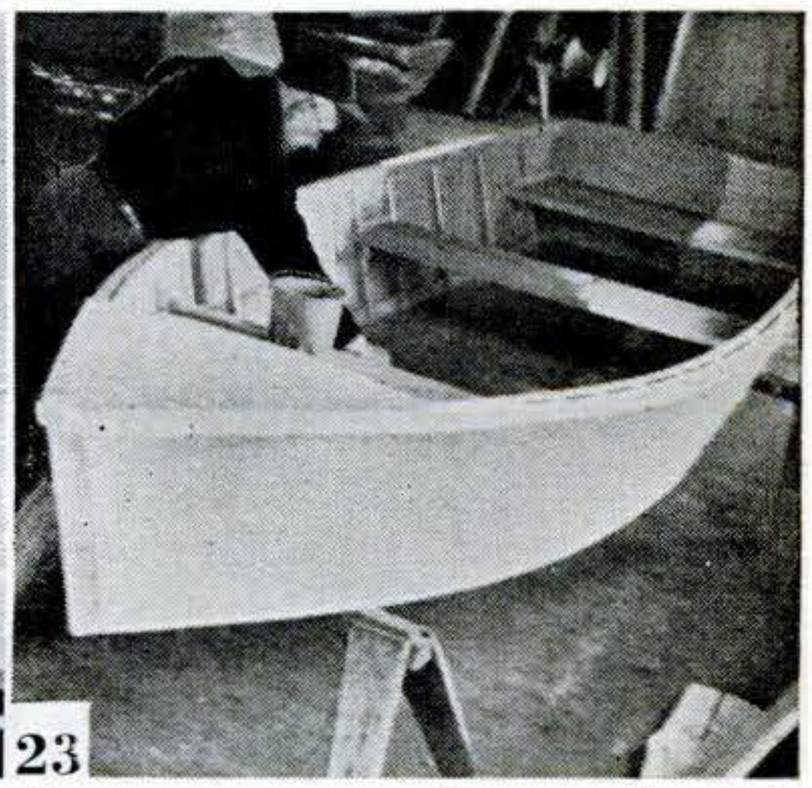


21



22

Four rub-planks will afford maximum protection to the bottom—two down the center and a narrow one along each edge. Now drill out any knots in the sides and fill all of these and the countersunk screw holes with wood plugs. dipped in marine glue and tapped home.



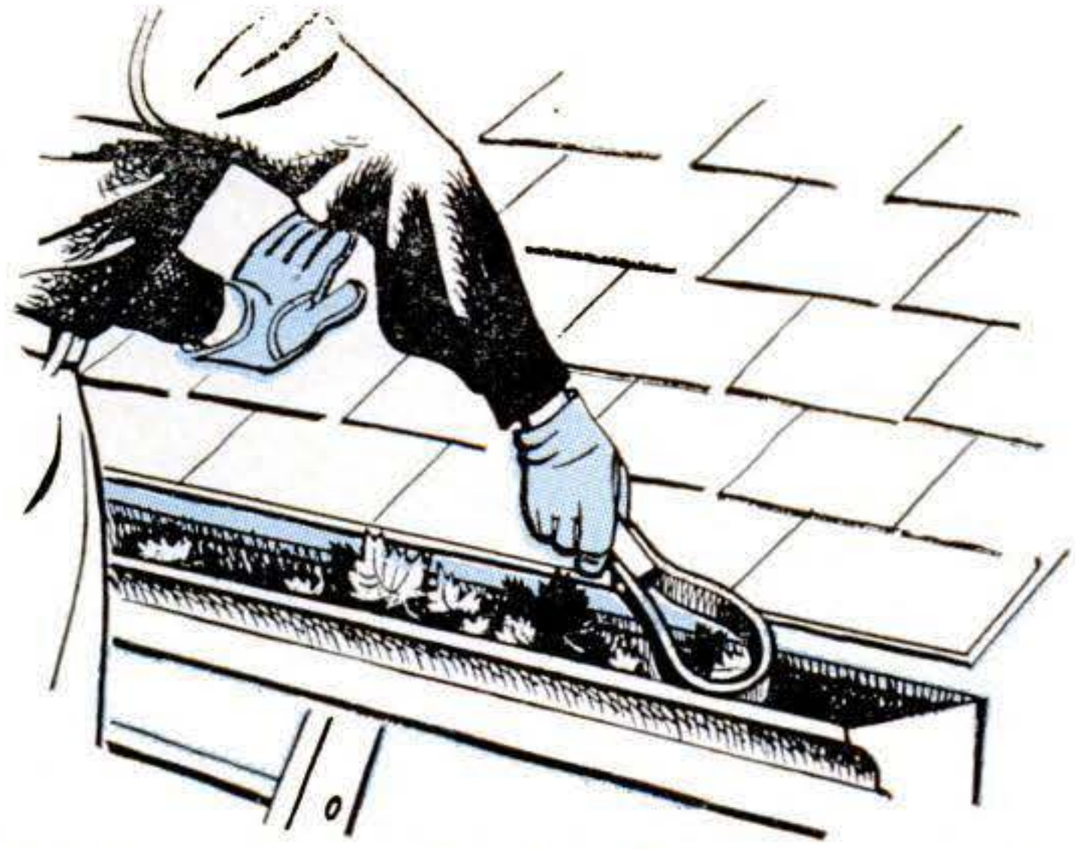
23

As the final step, go over the outside with a power sander, smoothing all the rough edges. Then apply several coats of paint, inside and out. When the paint is dry, install oar locks in the desired position, get a good pair of oars, and you're set to hit the water. END

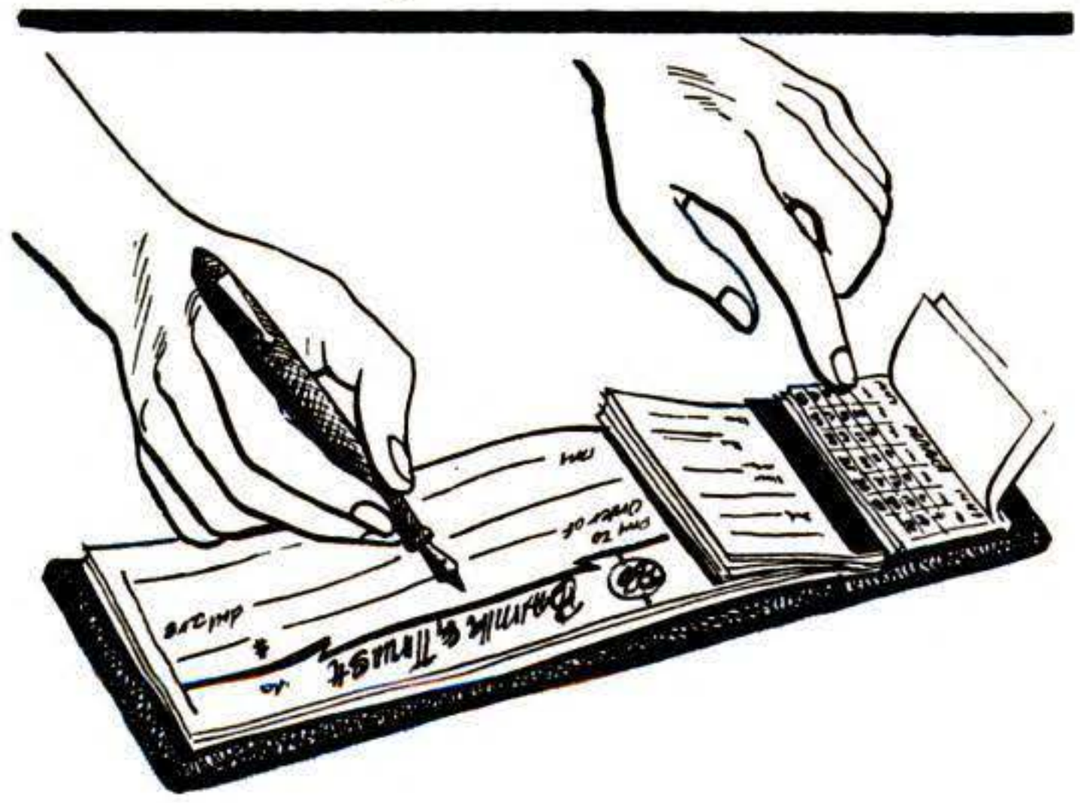
Copyrighted material

Keeping the Home Shipshape

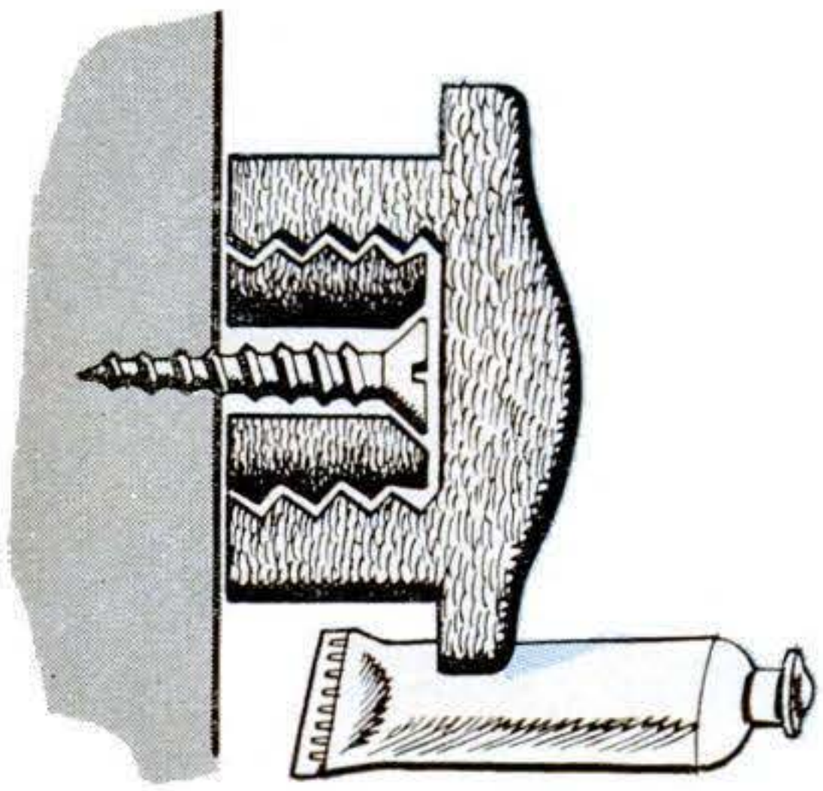
A lawn-mower stirrup bent from strap iron as shown, or one made from an old bicycle pedal, will enable you to kick as well as push the mower through clumps of tough or wet grass.



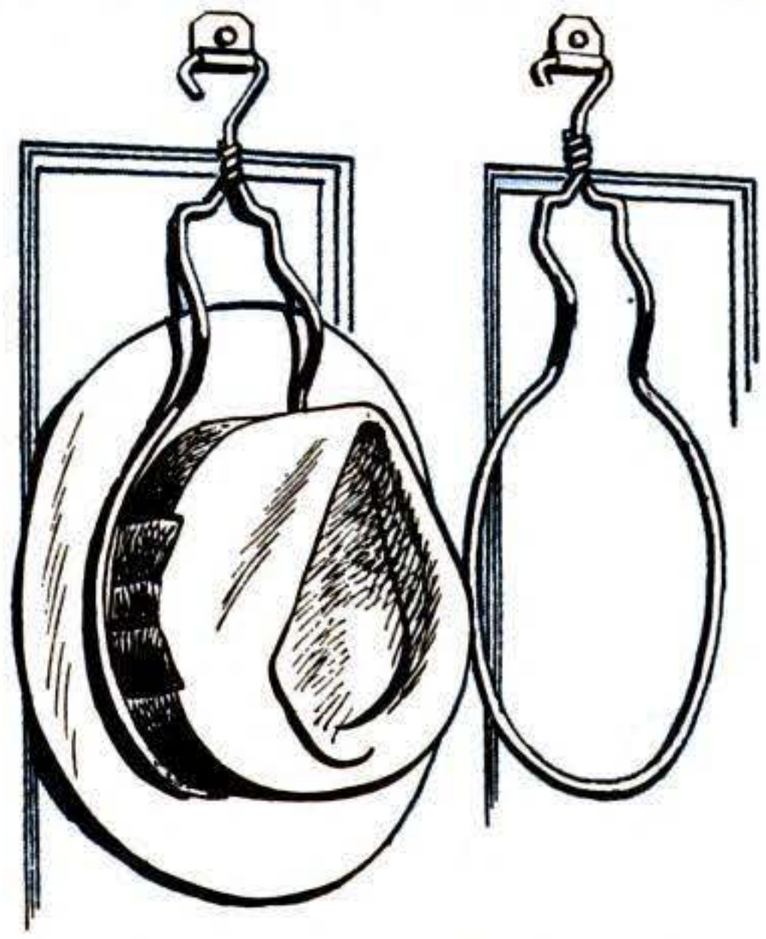
Nailing a piece of rubber belting to a wooden handle makes a good cleaning tool for gutters. The flexible belt follows the trough contours but can't scratch the paint or other coating.



Glue a miniature calendar inside the cover of your checkbook as an aid in keeping accounts straight. It saves time and prevents errors in dating checks and reviewing bank statements.

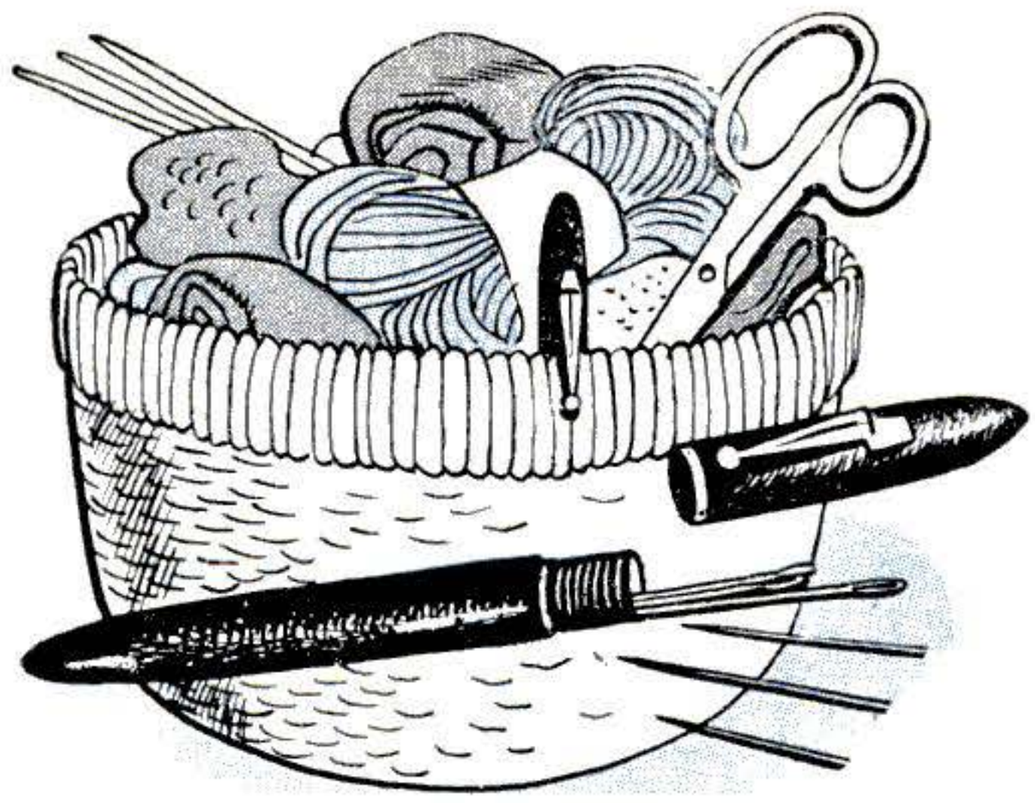


Plastic screw caps from toothpaste and similar tubes make useful knobs for small objects. Cut off the lead neck of the tube and attach it with a wood screw. Then simply screw on the cap.



Hat racks made from coat-hanger wire and hinged inside a closet door help keep men's hats in shape and leave more space on closet shelves. Hold the wire with a clip and screw.

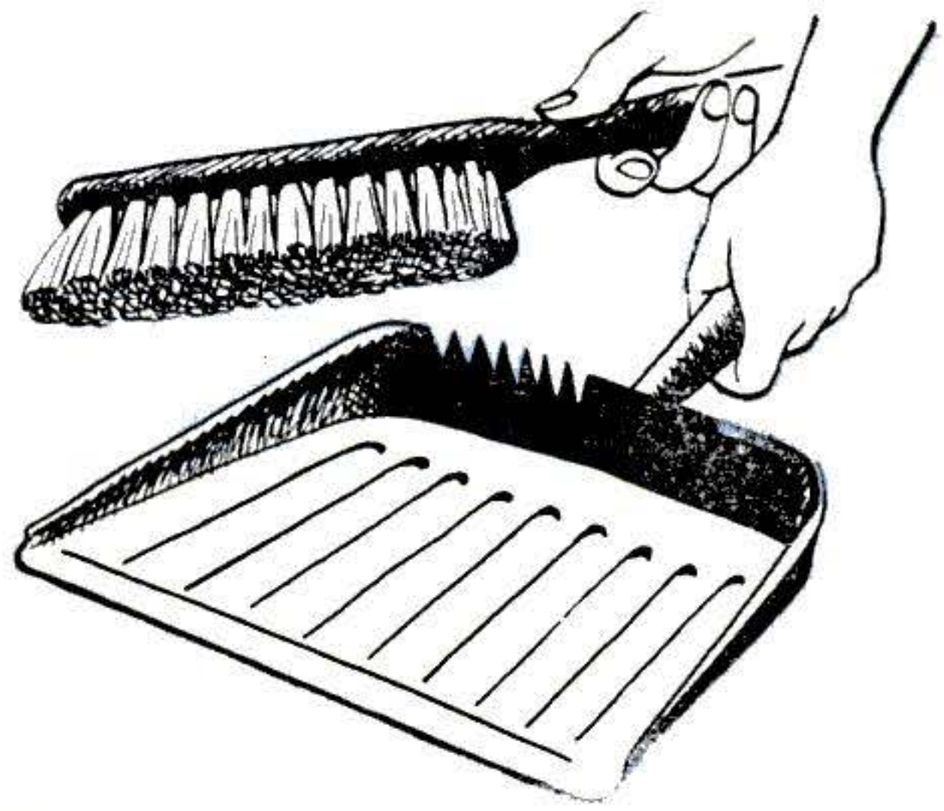
Copyrighted material



Pins and needles will be handy and safe if you keep them in the barrel of a fountain pen. Remove the point and tube. An old pen clipped in a purse is also good for carrying hairpins.

Gear-type can openers can be cleaned easily and thoroughly with a toothbrush. The bristles get into the small teeth and crevices to remove dirt that might not otherwise be reached.

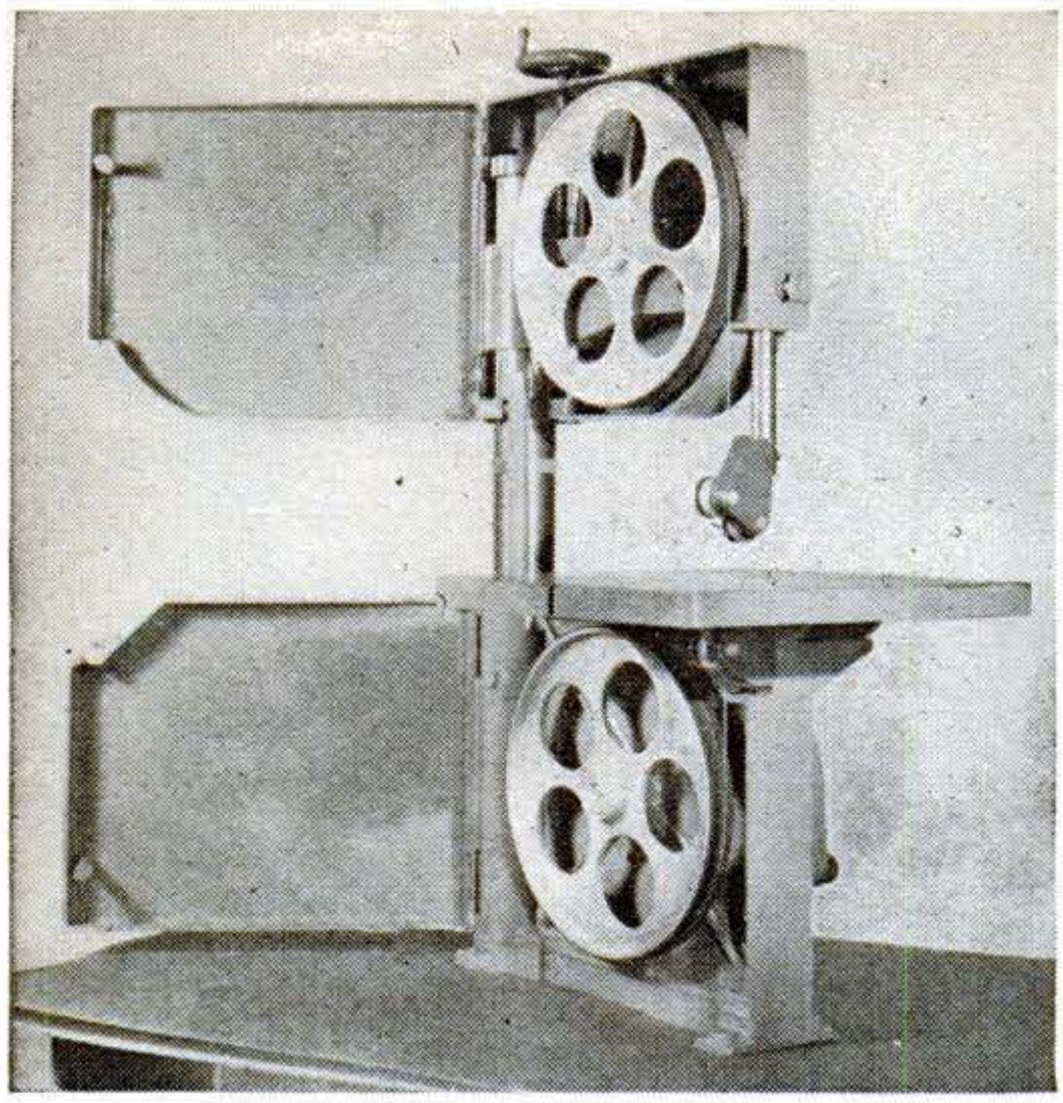
Plastic pieces that have become dull can be polished with rouge lipstick. Apply the rouge to a clean cloth and rub it on with a circular motion. Buff with a bit of dry flannel.

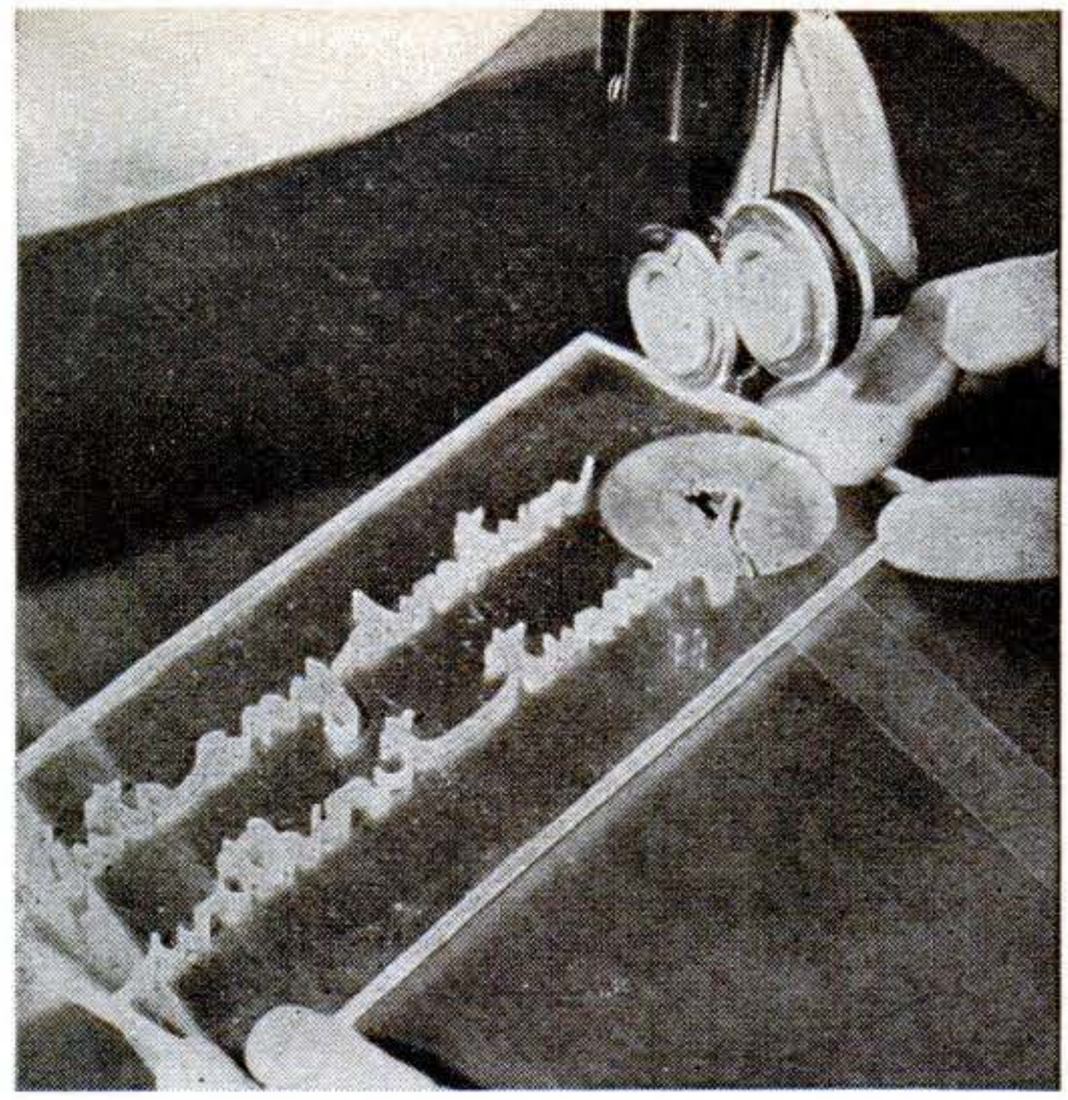


A few teeth filed in the raised back edge of a dustpan make a good comb for cleaning brushes. File the teeth about ½" deep and smooth off burrs that might catch the hands or clothes.

Breakfast in bed is more fun when you don't have to juggle a tray on your lap. An ironing board of the folding type, used as shown, is a convenient substitute for a regular bed tray.

Copyrighted material



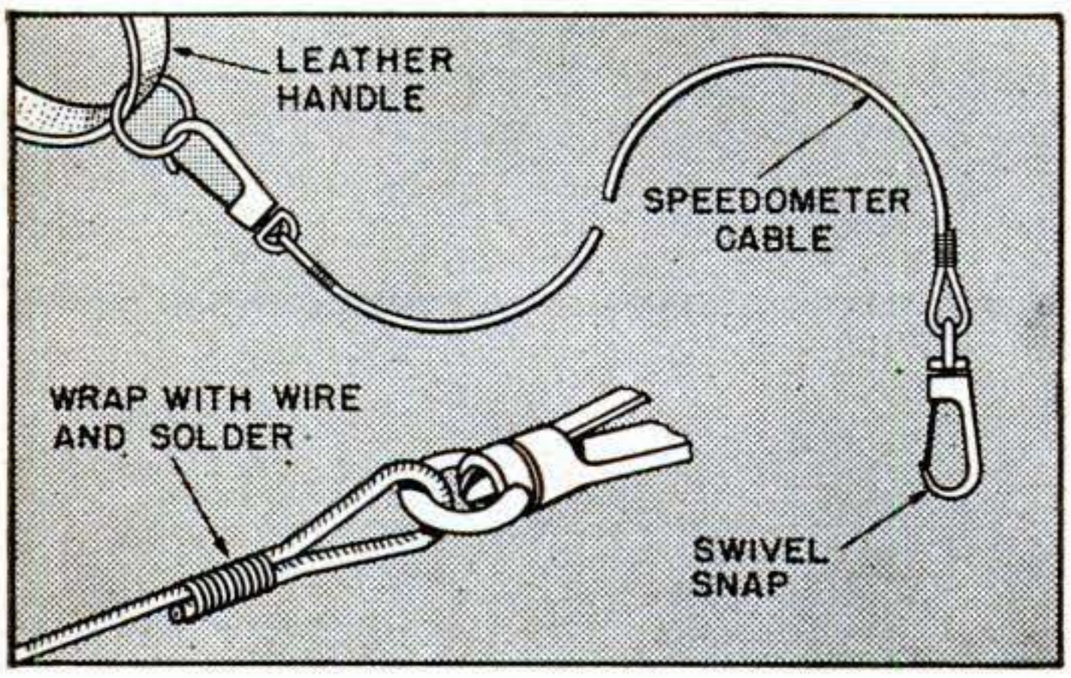


Spiral-Blade Bandsaw Cuts in Any Direction

CUTS may be made in any direction without turning the work when you use this spiral-blade bandsaw. You merely feed the work, guide the blade along the desired line, and it cuts any design that may be drawn on plastic, wood, or metal—even script letters as in the photo at the right above.

Made by the Tyler Manufacturing Company, of Santa Monica, Calif., the saw is 36" high and has a 12" throat. Since the work need not be turned, designs that can be cut are not limited by the depth of the throat, as in conventional saws.

Roller-bearing assemblies with rubber tires maintain an even pressure against the blade. Mounted in drill-press fashion, the upper assembly has a 4" adjustment. The machine may be operated either from front or back, and four speeds are available through a four-step cone pulley.

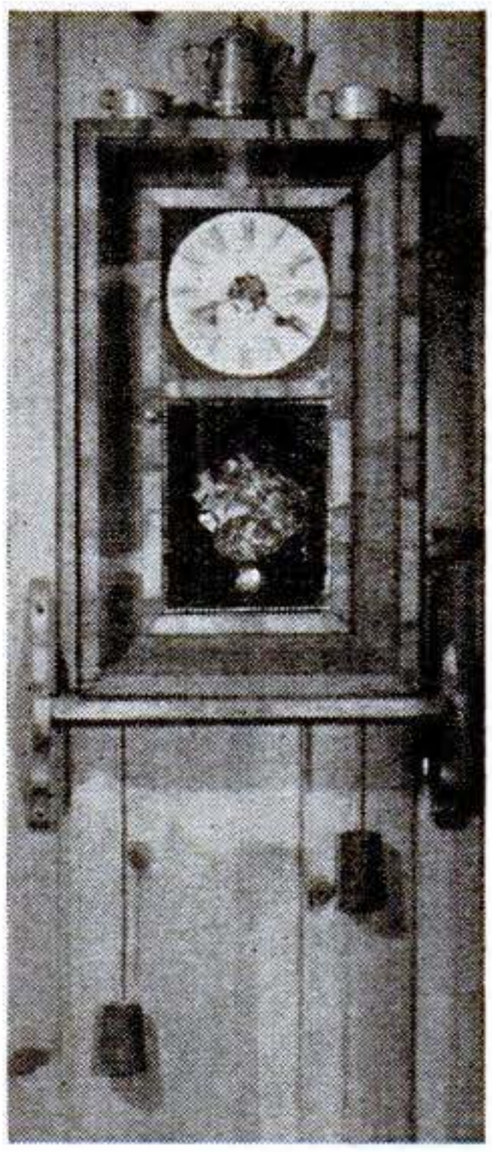


Speedometer Cable Leads Dog

STRONG, flexible, and practically kinkless, an old speedometer cable can be turned into an excellent leash for your dog. Double back each end through the ring of a swivel snap, wrap closely with fine wire, and flow solder over the wire.

I also made a separate handle from a leather loop equipped with a small metal ring. Either end of the cable can be snapped to the ring or to the dog's collar. The result has been highly satisfactory.—*John G. Anderson, Pittsburgh.*

Clock Now Wound Less Often

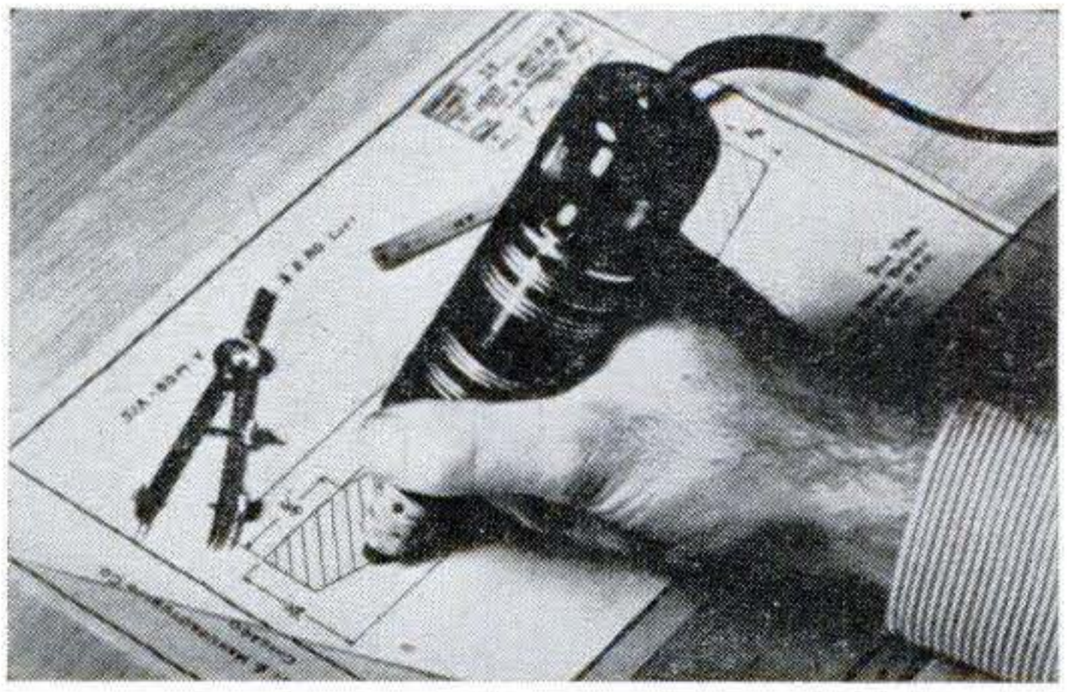


MANY oldtime wall clocks must be wound every 30 hours, but this does not have to be so. You can lengthen the period between windings simply by lengthening the cords on which the weights depend.

Drill ½" holes through the bottom of the clock in line with the outer edge of the top pulleys, pass cords of any desired length up through the holes, and tie them to the original cords after removing the weights. Waxed casting line of 18- or 20-lb test is excellent for this. Replace the weights on the new cords, and the conversion is complete. —*Norbert Engels, South Bend, Ind.*

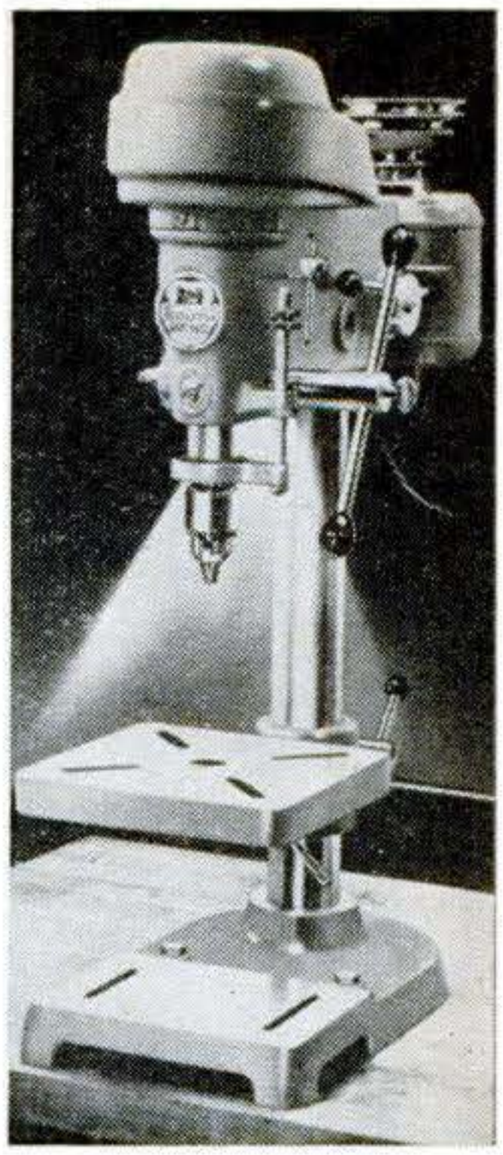
Copyrighted material

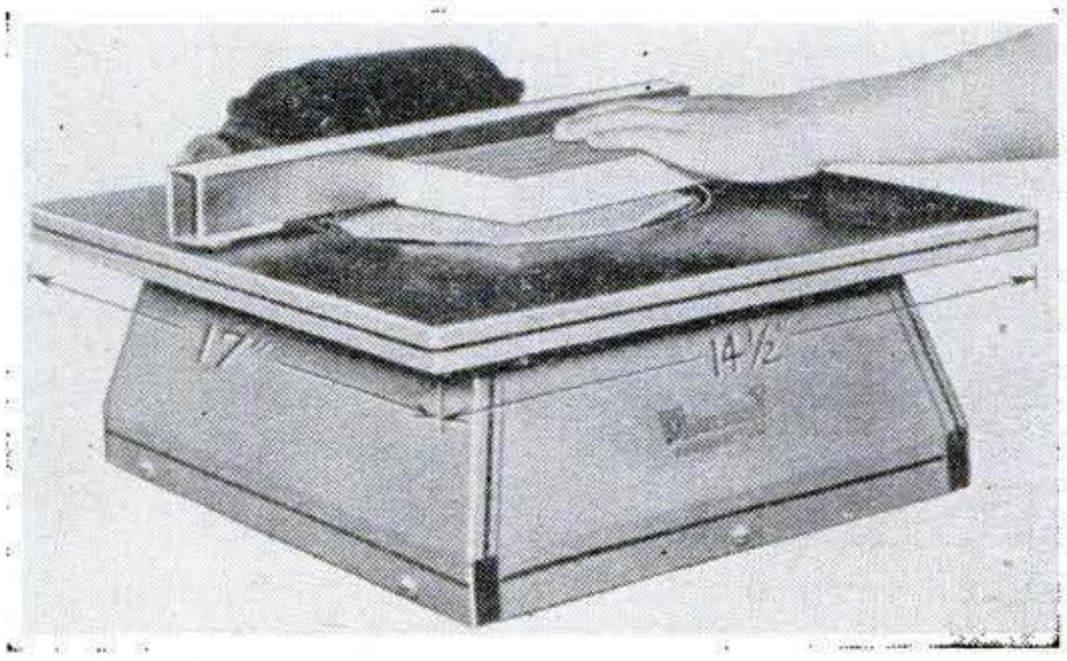
NEW TOOLS



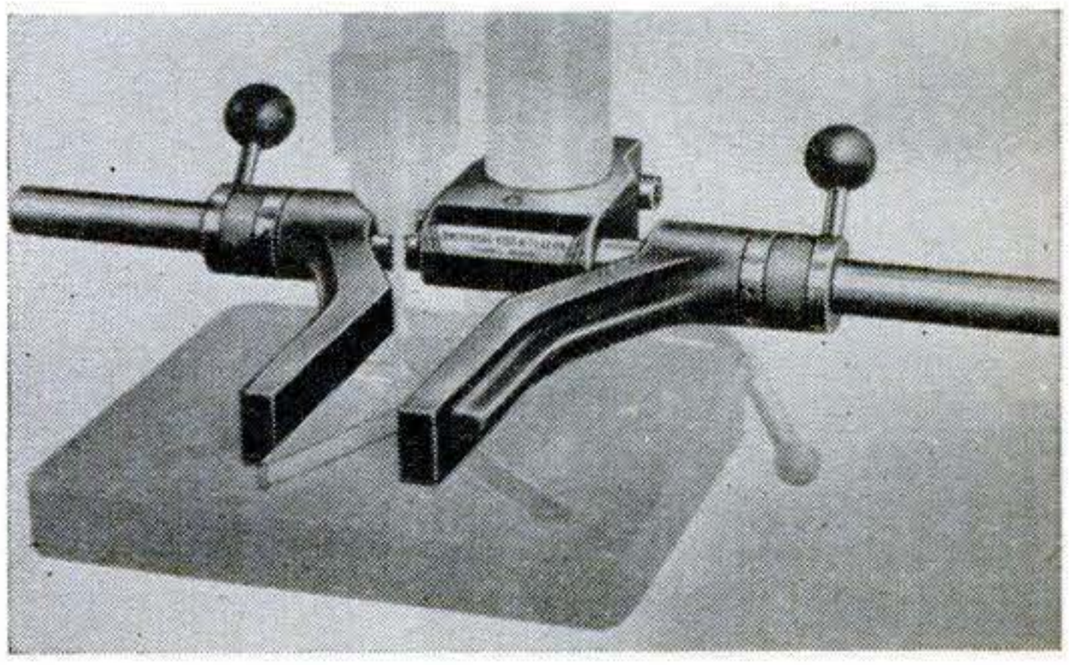
Erasing by Power. Weighing only 12 oz., this electrically driven eraser is a new product of the Chicago Wheel & Mfg. Co., of Chicago. It embodies the same motor as the company's Handee Tool Ⓣ, and a quick-change chuck accepts standard erasers.

Light Built In. A 14″ drill press introduced by the South Bend Lathe Works, of South Bend, Ind., has a built-in light with switch to provide shielded illumination for the work area. Both bench and floor models are in production, each having a capacity to drill ½″ in iron or steel at the center of a 14″ circle. The spindle has a maximum travel of 4″ and speeds of 707, 1,305, 2,345, and 4,322 r.p.m. The depth gauge, graduated in sixteenths, has adjustable collars to control both the depth of feed and length of return stroke.



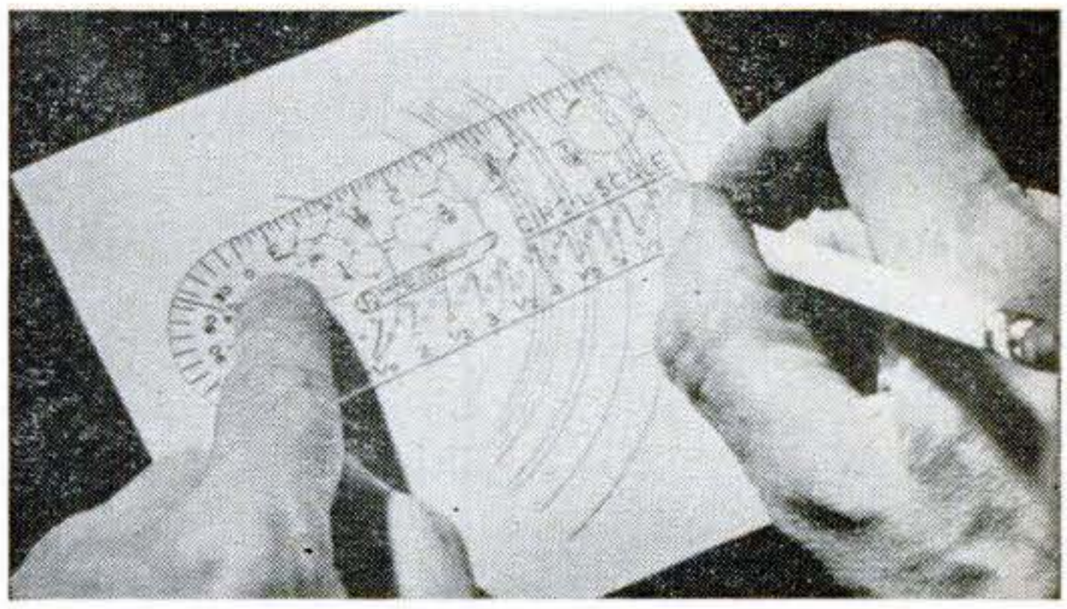


Sander Uses Square Sheets. A new horizontal sander introduced by Mastercraft Products, of Boston, has a 14½″ by 17″ working surface with an adjustable fence. It utilizes a "no gluing" disk for the abrasive that may be adjusted up or down to compensate for the thickness of the sheet. A 7″ by 7″ piece of any cloth-backed abrasive may be used. Without a motor, the tool costs approximately $24.

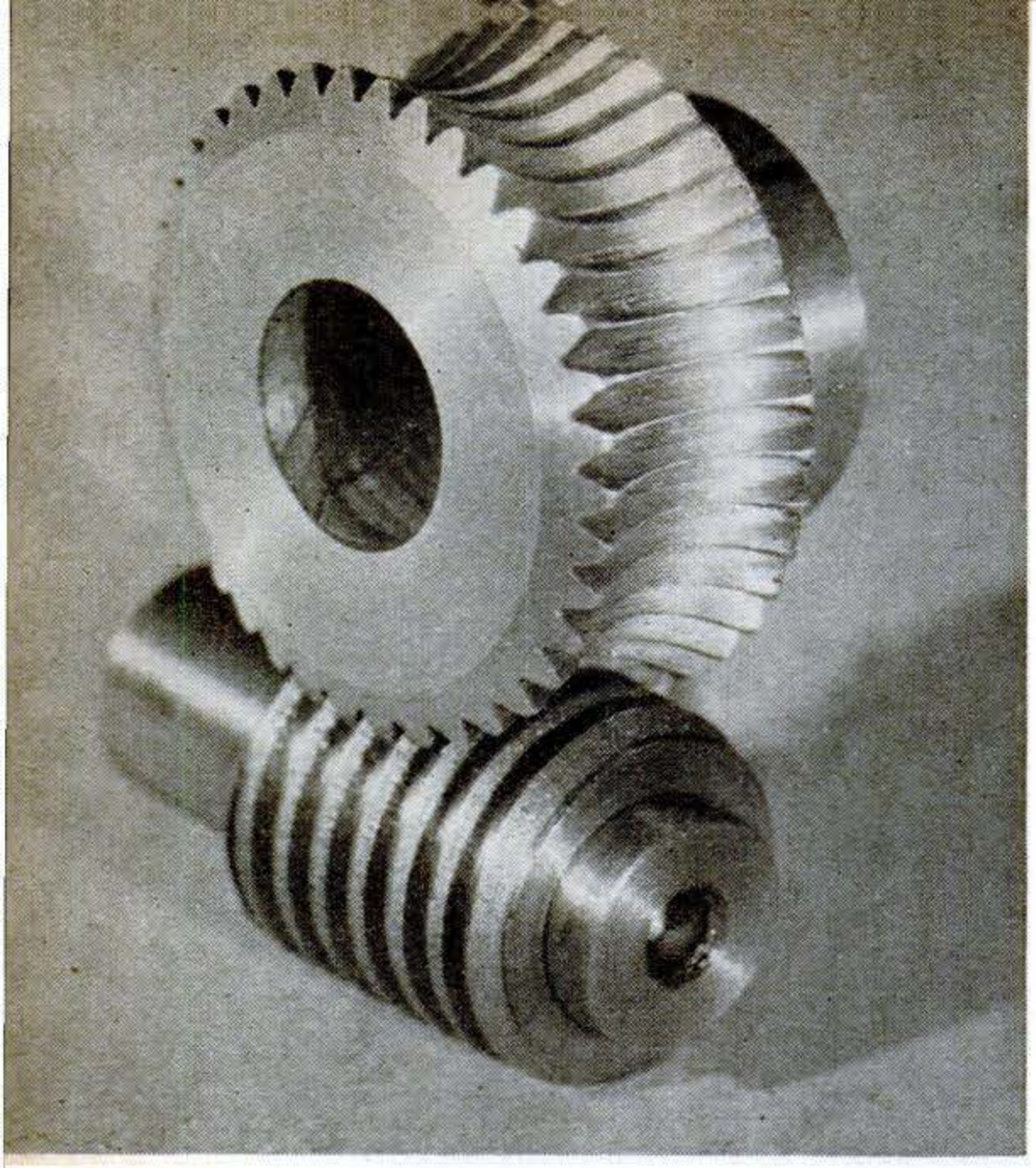


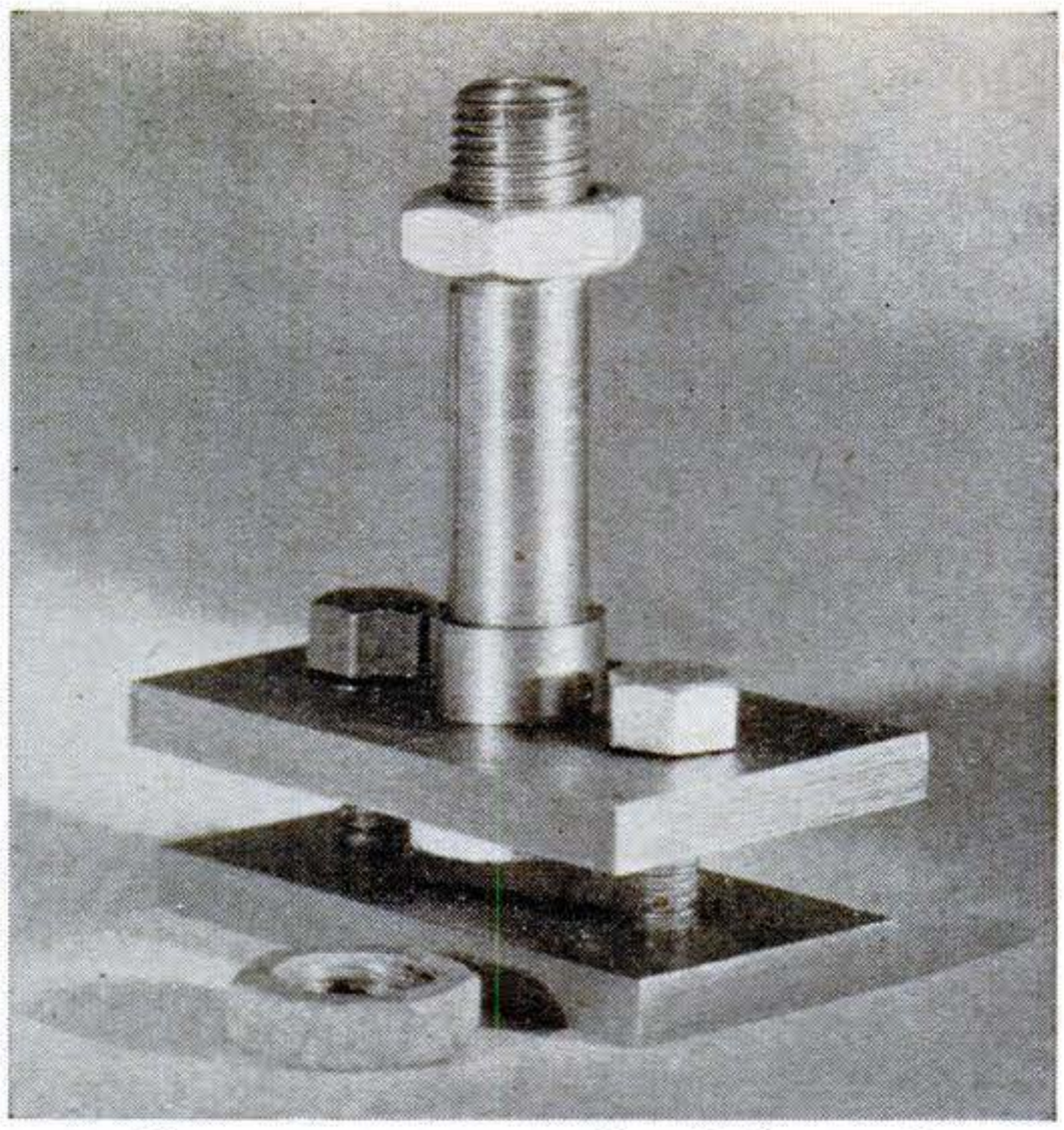
Holder Clamps to Drill Press. A work holder developed by Universal Vise & Tool Co., Parma, Mich., clamps to the column of any small standard drill press and secures the work with a quarter turn of a single lever. The clamping arms are adjustable along the cross arm to encompass the full width of the table and may be swung up and back to clear the table for a drill jig or machine vise when necessary.

Drafting Aid Fits Pocket. Designed to enable draftsmen and others to make detailed sketches while away from their drawing boards, this small device combines the features of a compass, protractor, ruler, and T-Square. For use as a compass, one end has a free-moving pivot button. Made of clear plastic, it is a product of the Danat Company, of Chicago, and retails for about 50 cents.

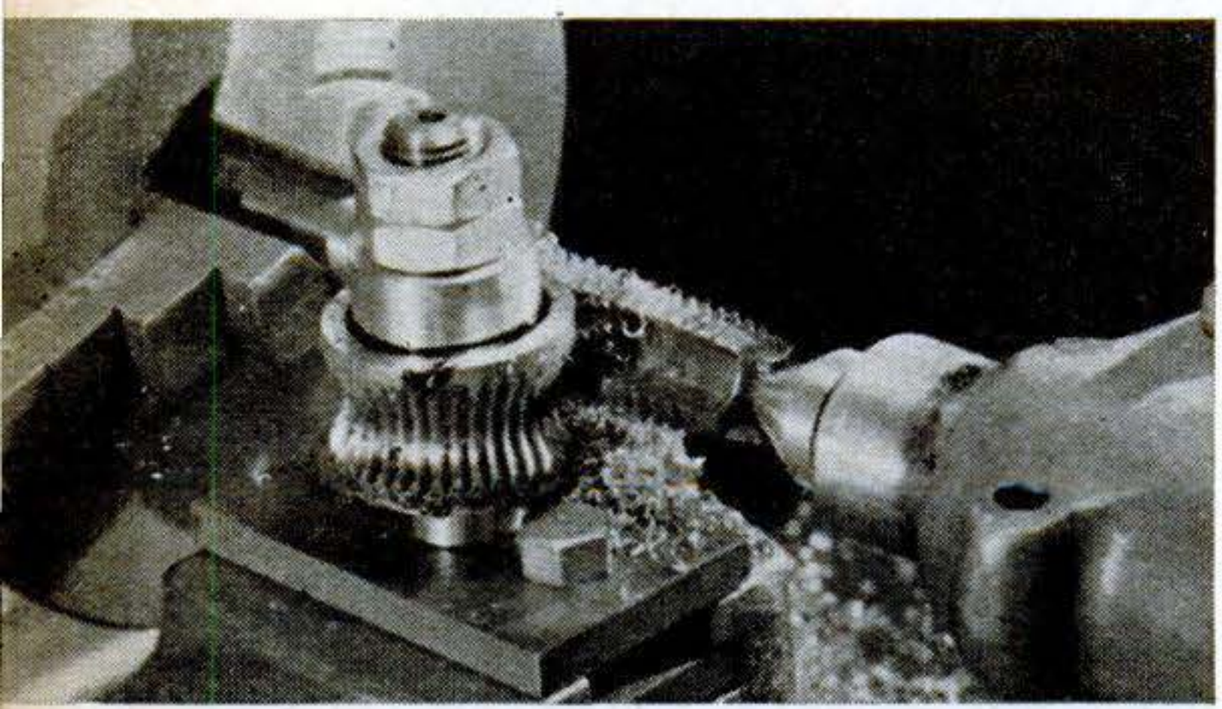


Copyrighted material

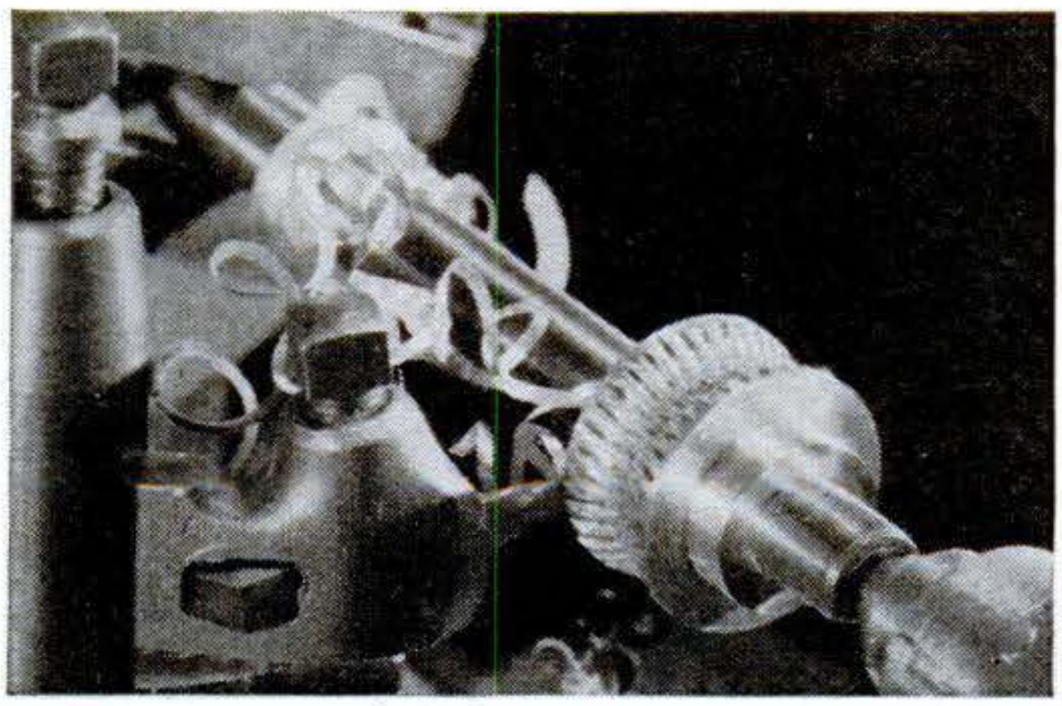




A hobbing fixture is made of flat stock, two bolts, and a threaded stud to suit the blank.



Blank must be at center height, free to turn. As tap teeth cut, lead of thread revolves it.



When teeth are full depth, gear can be mounted on an arbor to turn hub and chamfers on sides.

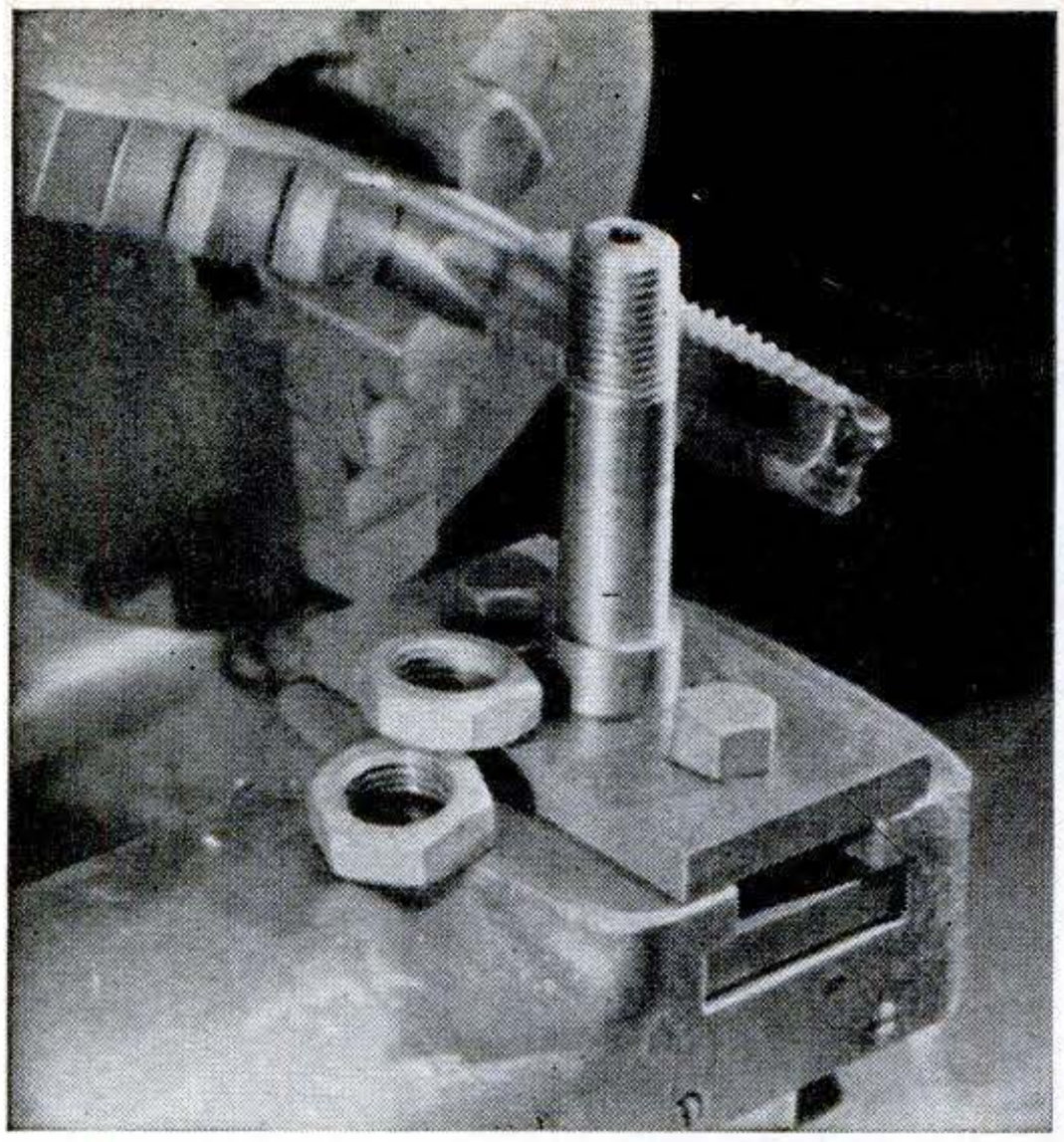
Making Worm Drives to Order

WHEN you need much speed reduction or great increase in torque, a worm drive may do the job more efficiently and compactly than a gear train. Calculation is easier, too, for the worm gear advances one tooth per revolution of the worm (in the common single-thread type). Thus the ratio is one to whatever number of teeth the worm gear has. Well suited to models, light machines, and sensitive controls, worm drives can be made up as you need them, even on a lathe without screw-cutting gears, by using a tap as the hobbing cutter.

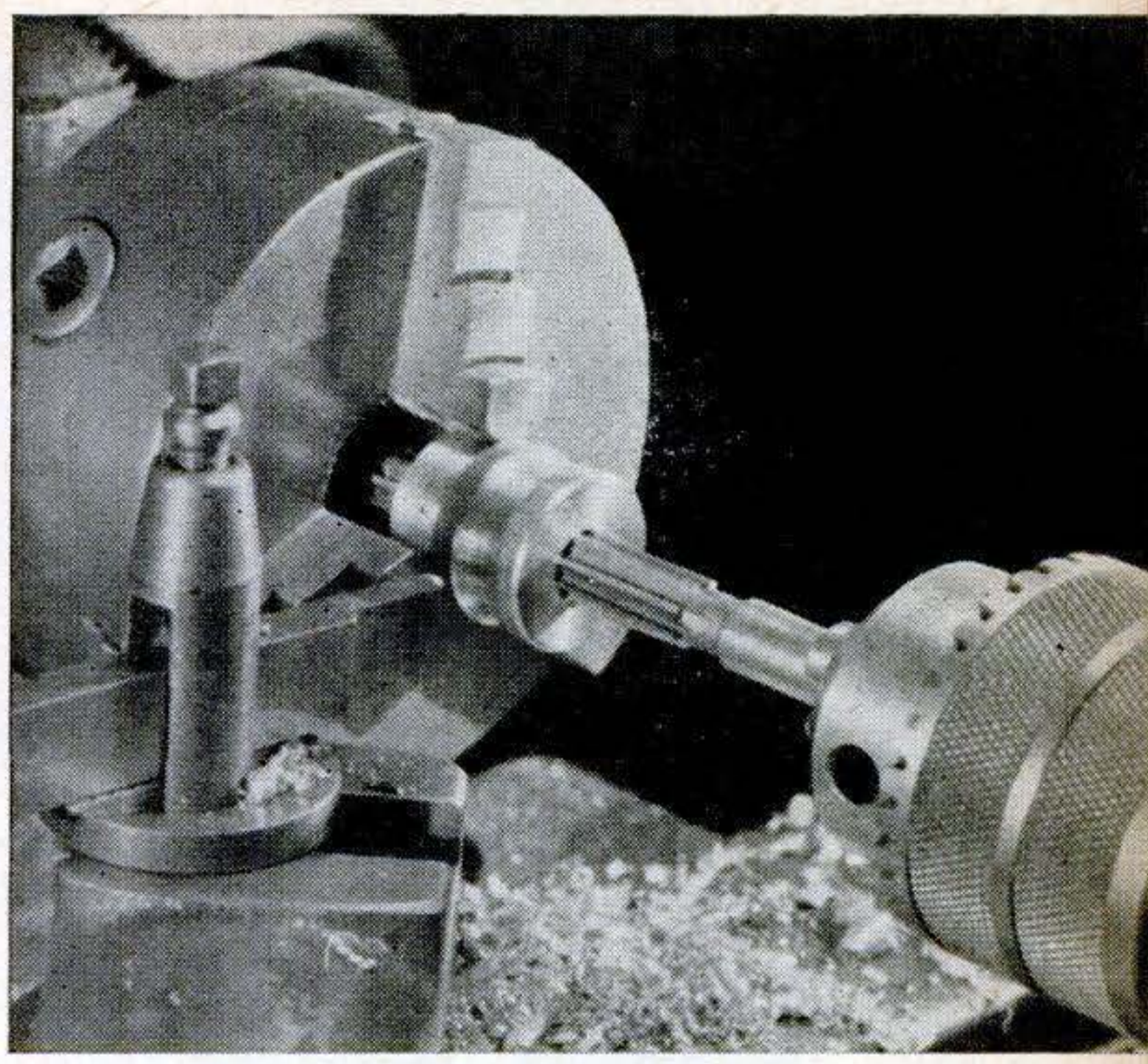
The worm can be made from a screw of suitable pitch simply by drilling a shaft hole and providing a setscrew, pin, or key. You can, of course, turn a special worm blank and cut the teeth with a die.

For the gear, a blank must be turned to a diameter on which the tap will generate the required number of teeth, and with a radius matching that of the worm. Multiply the number of teeth wanted by the pitch (distance between two threads on the worm) and divide the product by pi (3.1416). Now deduct the thread depth (see PS, Feb. '45, p. 185). Say a 1:40 drive is wanted, to use a 7/16″-14 screw as the worm. The pitch is 1/14″, or in decimals .0714″. Multiplied by 40 this gives 2.856″, which divided by pi

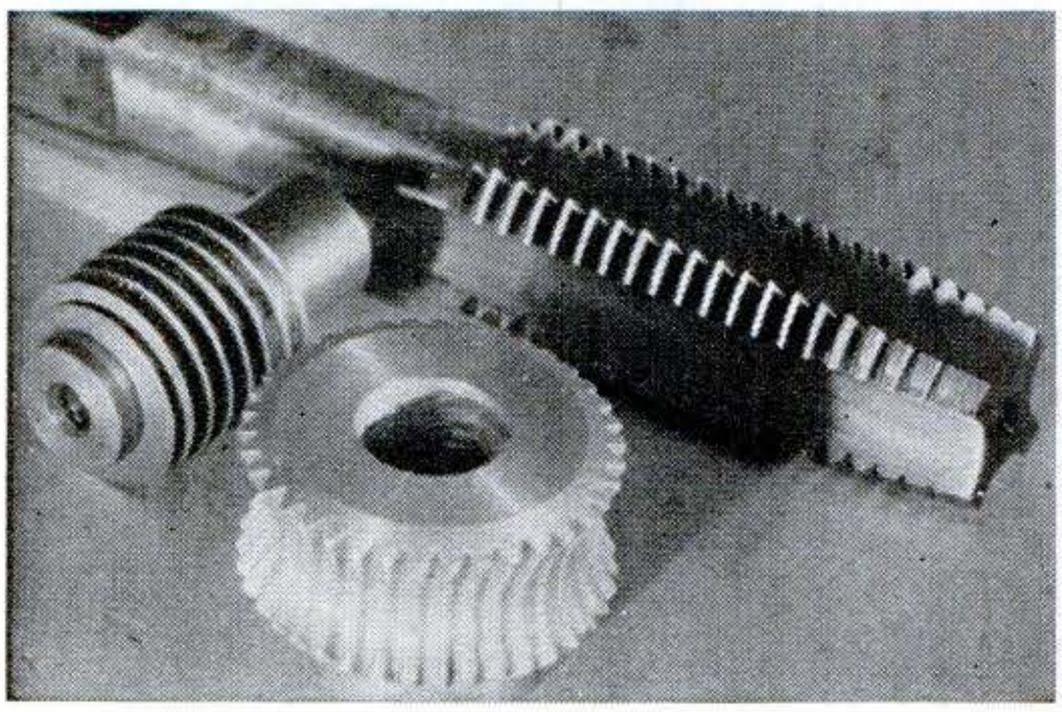
Copyrighted material



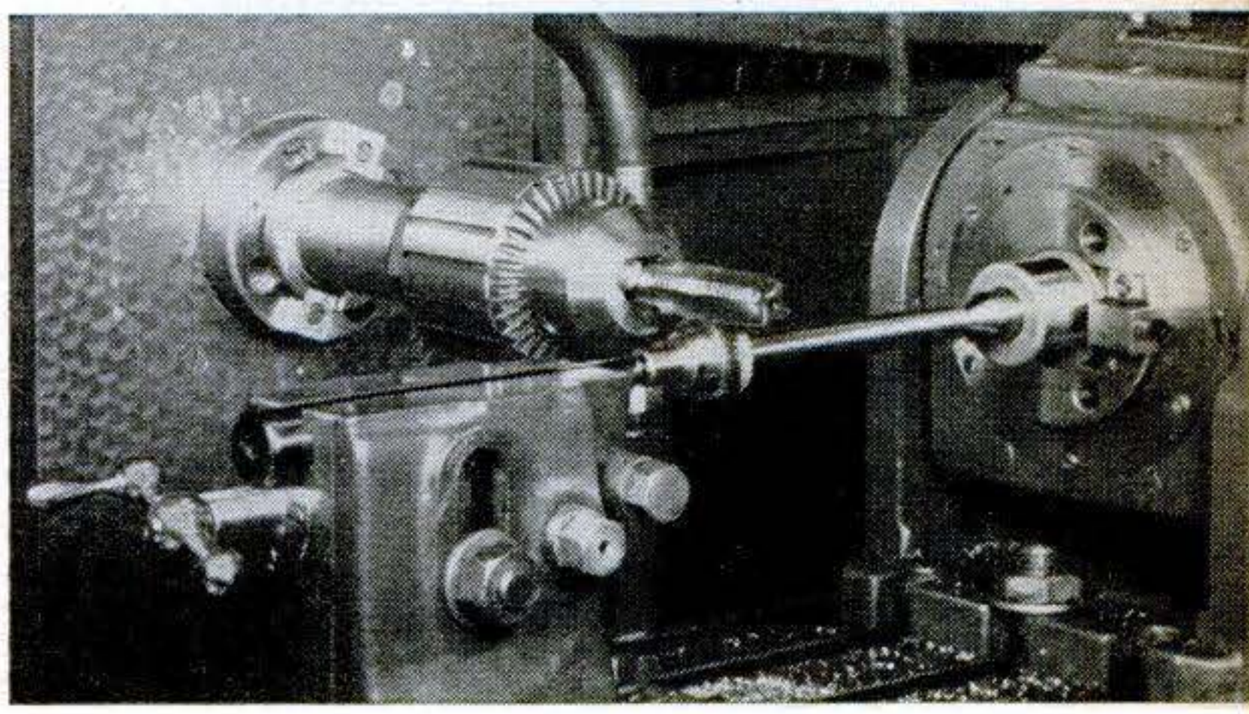
Replacing the tool post, the fixture clamps on the compound rest. Hobbing tap is chucked.



Gear blank, turned beforehand to the proper size and radius, is reamed to fit fixture stud.



A hub is turned on a common screw to make the worm, shown with gear and the hobbing tap.



Hobbing can be done the same way on a milling machine. Here too, blank must be free to turn.

gives .909″. Subtracting thread depth, or .046″, gives .863″ as the blank diameter.

This is the diameter of the blank in the throat—that is, measured at the bottom of the radius. It's best to leave the radius a bit larger, so the tap teeth will touch at the throat diameter first, and let the cutting edges form the correct curvature.

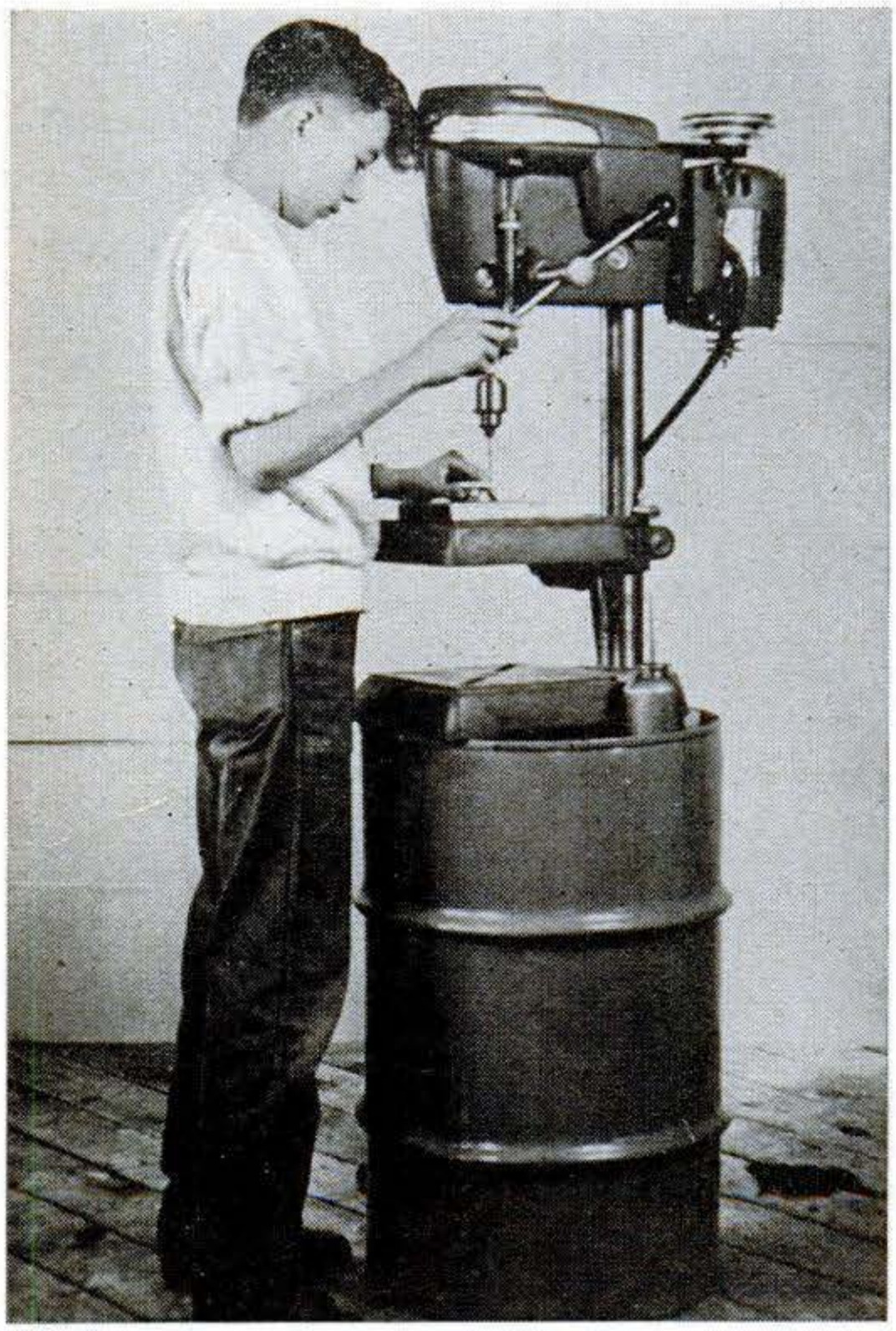
The photos above show a fixture on which the blank is mounted. Two bolts clamp it on the top slide, and two lock nuts secure the blank. For very light work, you can use a flat plate that slides into the compound-rest slot and is tapped to receive a bolt. A hex-head bolt with part of the shank unthreaded will do. The blank is slipped on this with spacer washers above and below, and as the bolt is tightened into the shoe it clamps everything fast. Adjust the spacers so that the blank remains free to turn but has little or no up-and-down play, with the throat diameter at exactly center height.

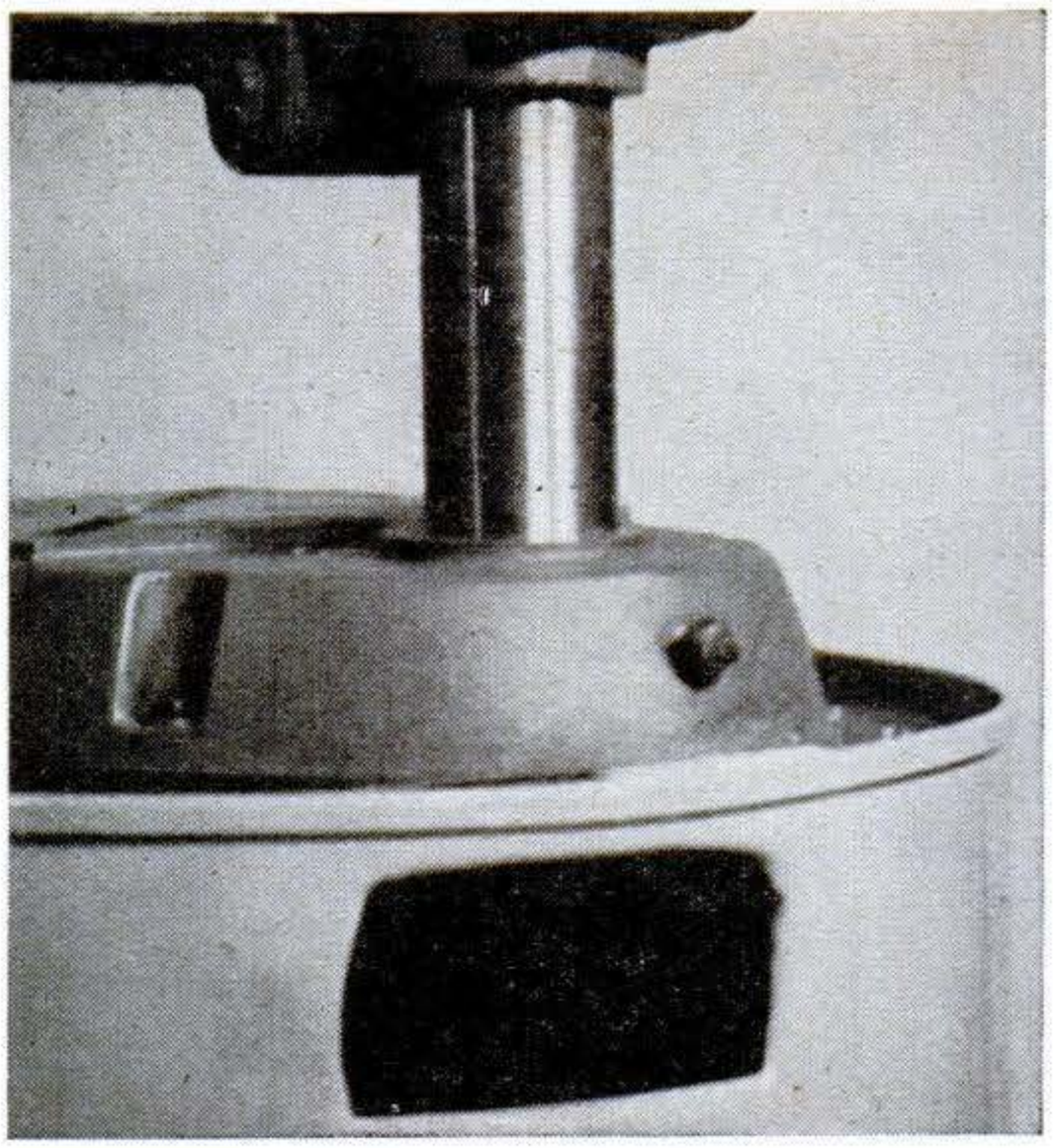
The tap, mounted between centers and driven by a dog or else chucked and supported by the tailstock as shown, should turn at slow speed. Carefully feed the blank against the revolving tap. As it begins to cut, the lead of the screw should turn the blank. With coarse teeth, it may be necessary to start the blank turning, but as soon as a shallow bite appears, the blank will continue turning of itself. Use lubricant or a cutting oil as you would for threading. Feed the blank in a distance equivalent to the standard depth of the thread used.

Lock the carriage when hobbing. It helps start the teeth to run the blank back and forth against the stationary tap, thus "knurling" shallow cuts. Fine teeth start more readily than coarse. If the blank falters once it has started to turn, it has "lost step" and may have to be discarded.

Copyrighted material

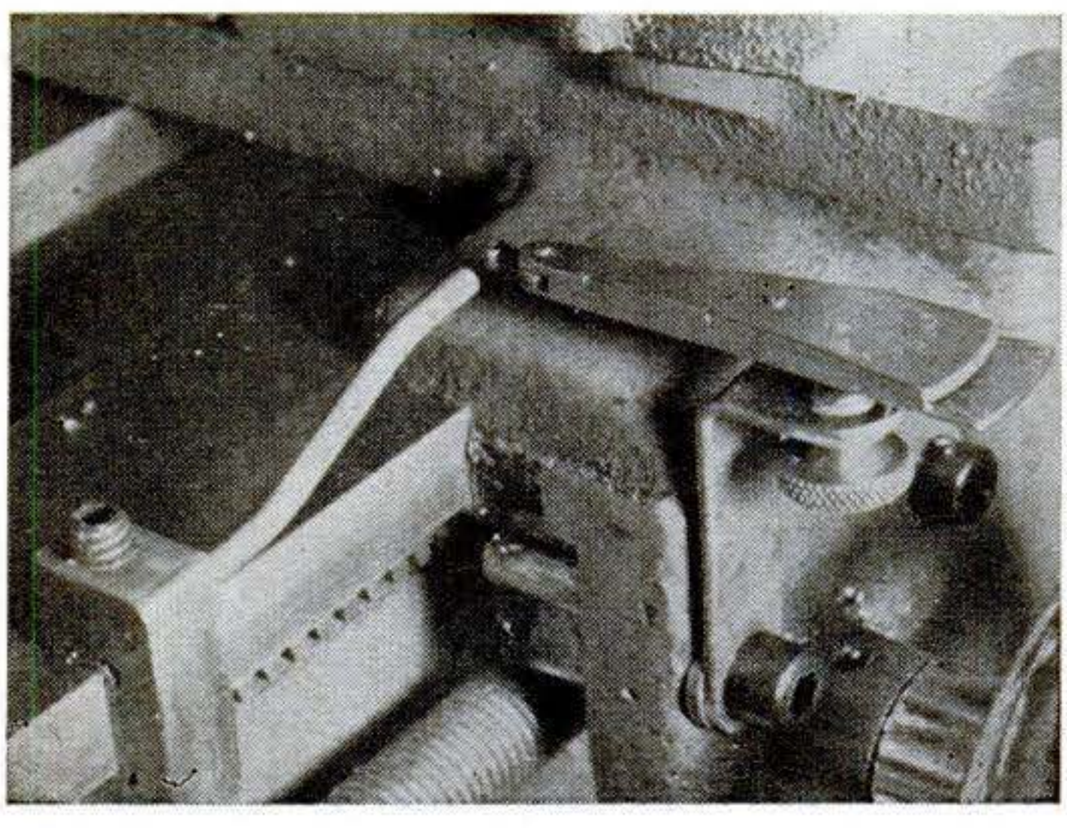
NEW SHOP IDEAS

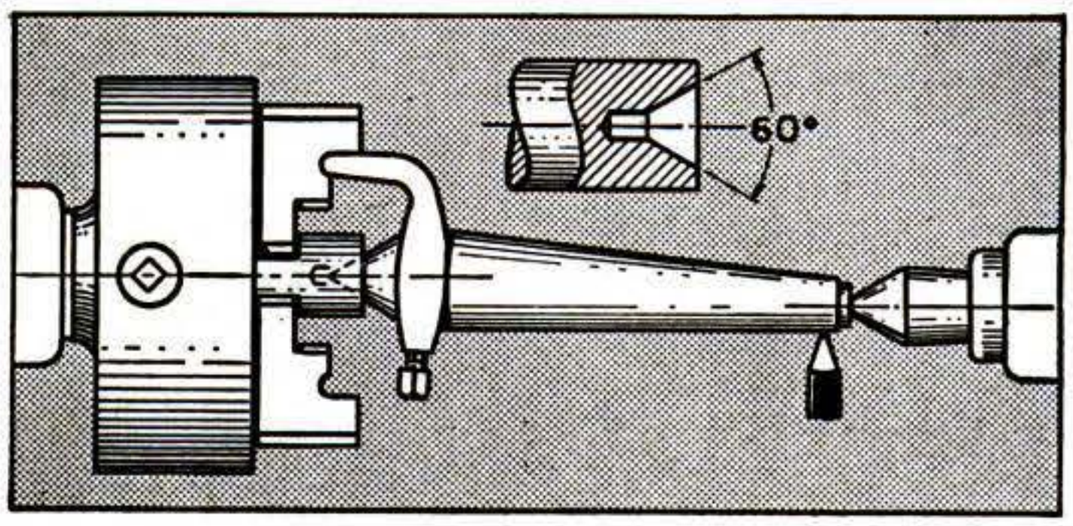




Drum Becomes Machine Stand. Old oil drums, filled with sand to get stability, can be turned into sturdy, shipshape machine stands. The 30-gal. size seems about right for such tools as a drill press, tool grinder, or disk sander; the 55-gal. size is best for bigger machines. A hand hole cut with a chisel near the top will give access to the nuts for the machine mounting bolts, and will afford an easy way of putting in the sand. Bend back the cut edges for safety.—*Wilber H. Fulker, Colorado Springs.*

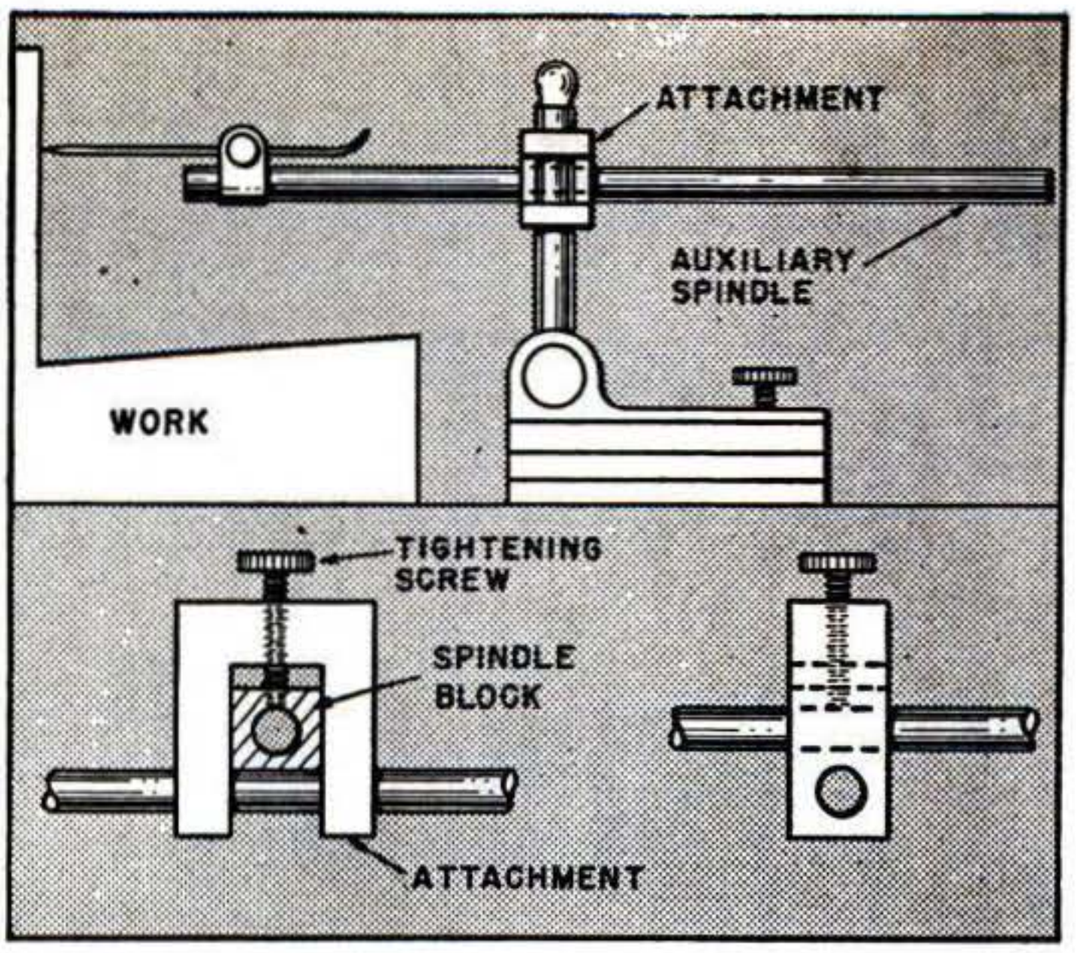
Indicating Carriage Travel. Better than a simple carriage stop for many facing, boring, and recessing jobs, an indicator mounted directly on the lathe carriage (below) lets you perform these tasks with delicacy and precision. The contact feeler on the indicator bears against a rod held in an ordinary carriage stop, while the indicator is attached to the apron by a bracket.—*John M. Avery, Delhi, N. Y.*



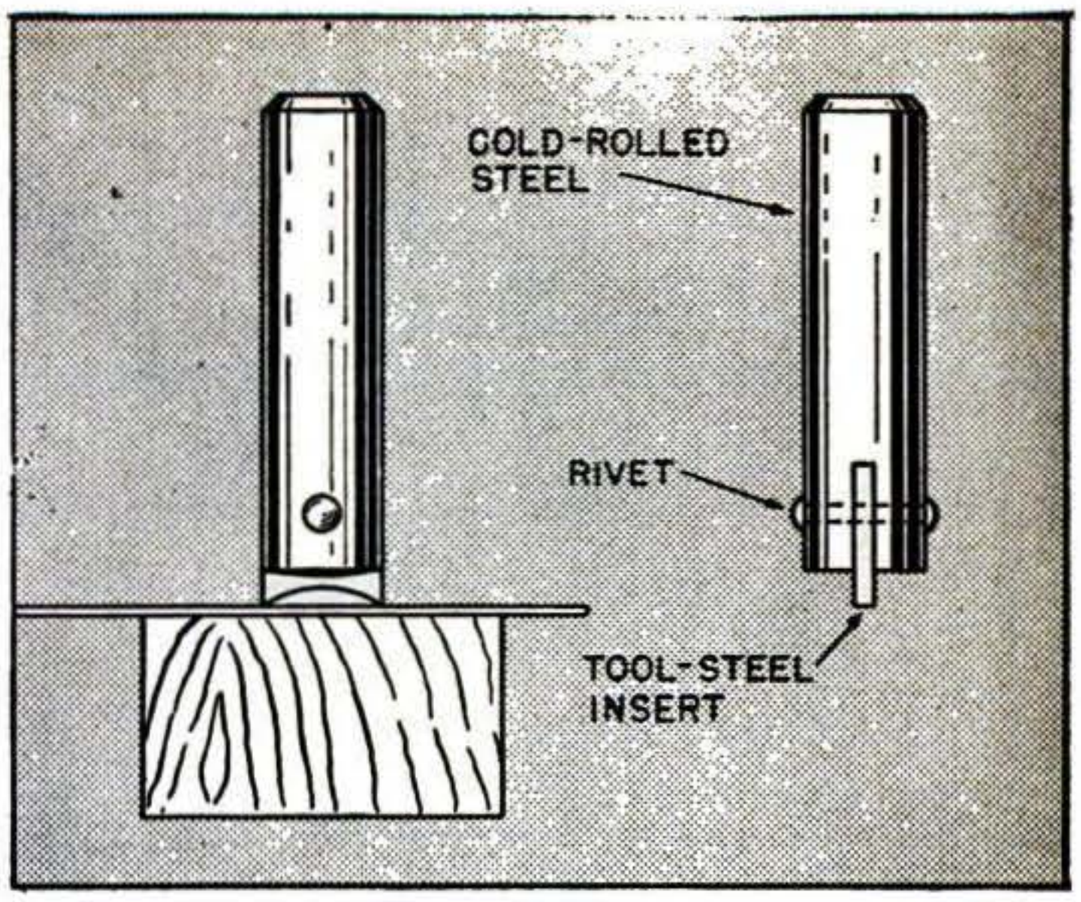


Using Hollow Centers. In reclaiming old lathe centers, or in machining other pieces where center holes cannot be drilled in both ends, the setup shown above comes in handy. With the tailstock offset it is of course impossible to chuck the work directly, but chucking a hollow center to hold the work and driving it with a lathe dog will give excellent results. Make the hollow centers from cold-rolled steel, truing each one up with a light cut whenever it is rechucked. Although a big centerdrill in the tailstock may give fair results at truing, it's preferable to set the compound at 30 deg. and true with the compound feed.

Copyrighted material

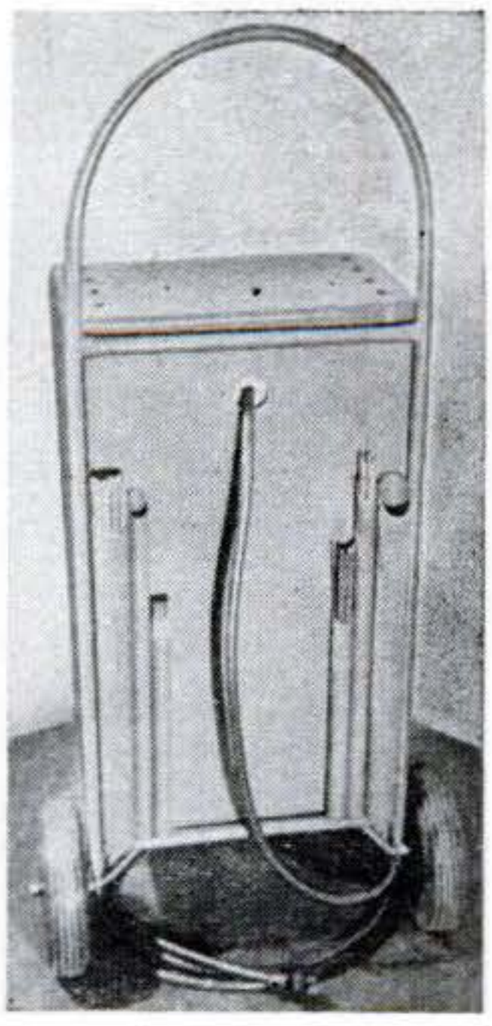


Increasing Surface-Gauge Reach. With some work a surface-gauge scriber cannot be brought against the face, and the usual expedient of placing the gauge on a number of parallels is often a bit unsteady. To reach these long-distance parts, I use a piece of drill rod the same diameter as the surface-gauge spindle, holding it in a steel yoke inside which is a square block that slips over the upright. A single screw holds the rod in the block and the block against the spindle. Any reasonable distance can be scribed if the gauge is balanced by a rod long enough to reach well behind the tool.—*Harry Moore, Leeds, England.*

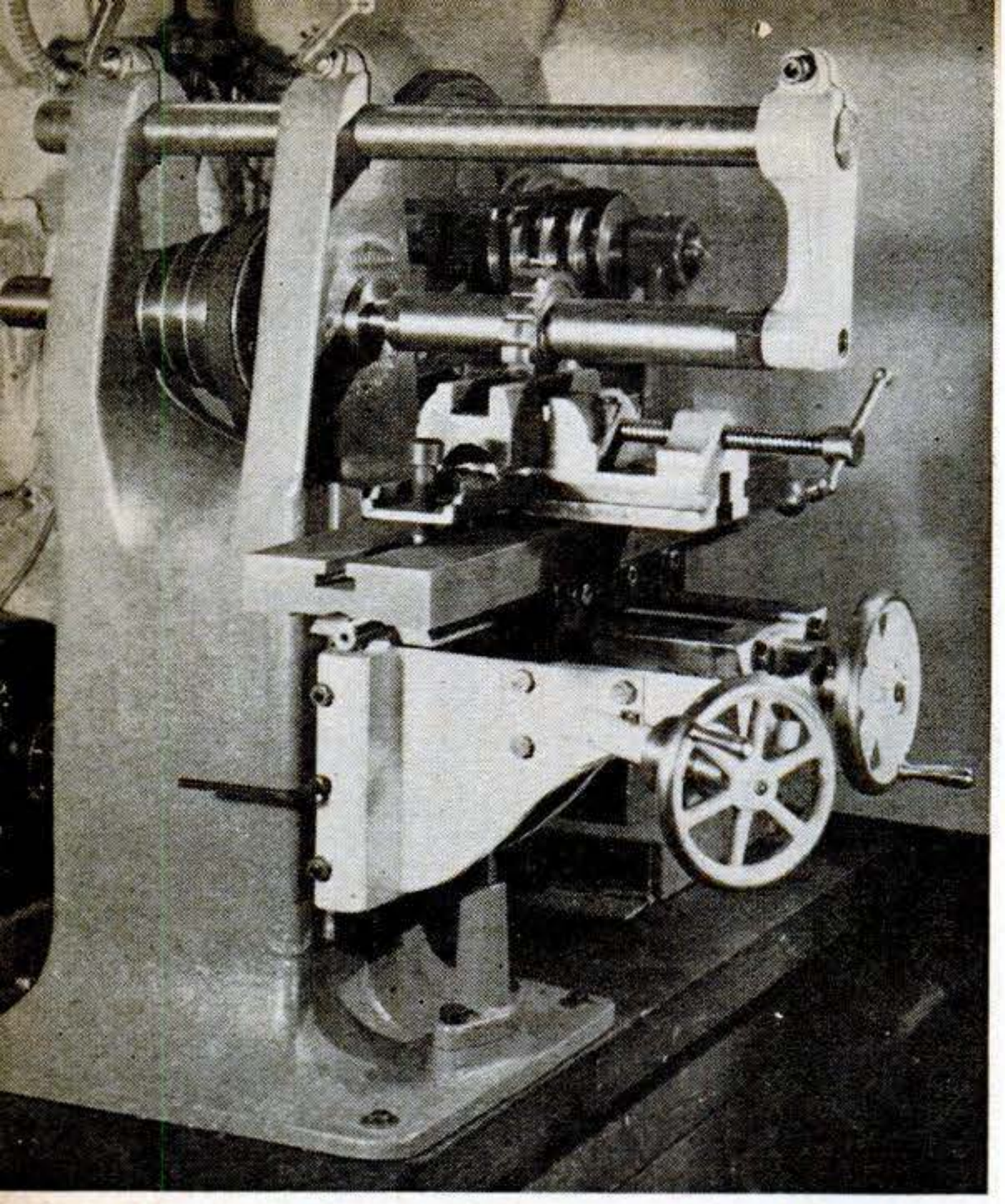


Punch Cuts Slots. Useful in sheet-metal work, modelmaking, and preparing radio chassis, this punch will cut a clean slot with one or two hammer blows—much faster and easier than by the drilling-and-filing method. It can even be used to cut special rectangular or triangular openings. The cutter, which should be tool steel, may be made by annealing and cutting a blank from an old wood saw, filing it to shape, rehardening it, and riveting it in the sawed notch of the steel shank. Don't omit the curve of the insert, which gives a shearing action to the cut. End grain of a hardwood block makes a good backing surface during punching.—*Richard Salzer, Baldwin, N. Y.*

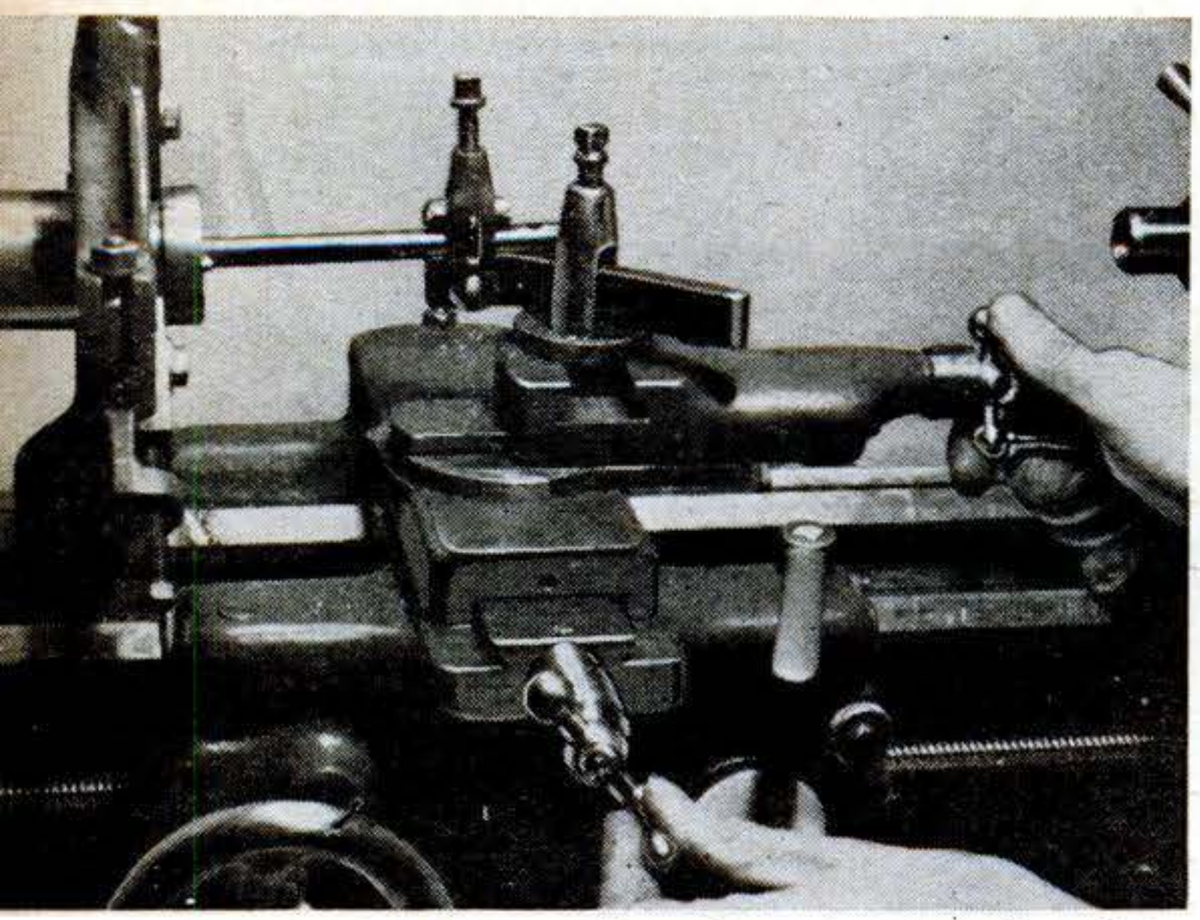
Homemade Welder Cart. Tired of lugging assorted equipment and supplies around the shop with my small transformer-type welder, I built the cart pictured at the right. The cabinet beneath the welder holds all necessary equipment, and on the back rod holders cut from conduit contain a good supply of various welding rods. The handle and frame are bent up from ½″ electrical conduit with brazed joints, and the cabinet built of birch. A pair of 2″ by 8″ wheels carry the cart. I finished off the job with four sprayed coats of lacquer, which seems to give better protection against spatter than does enamel.—*John G. Lownsbery, Richmond, Va.*



Copyrighted material

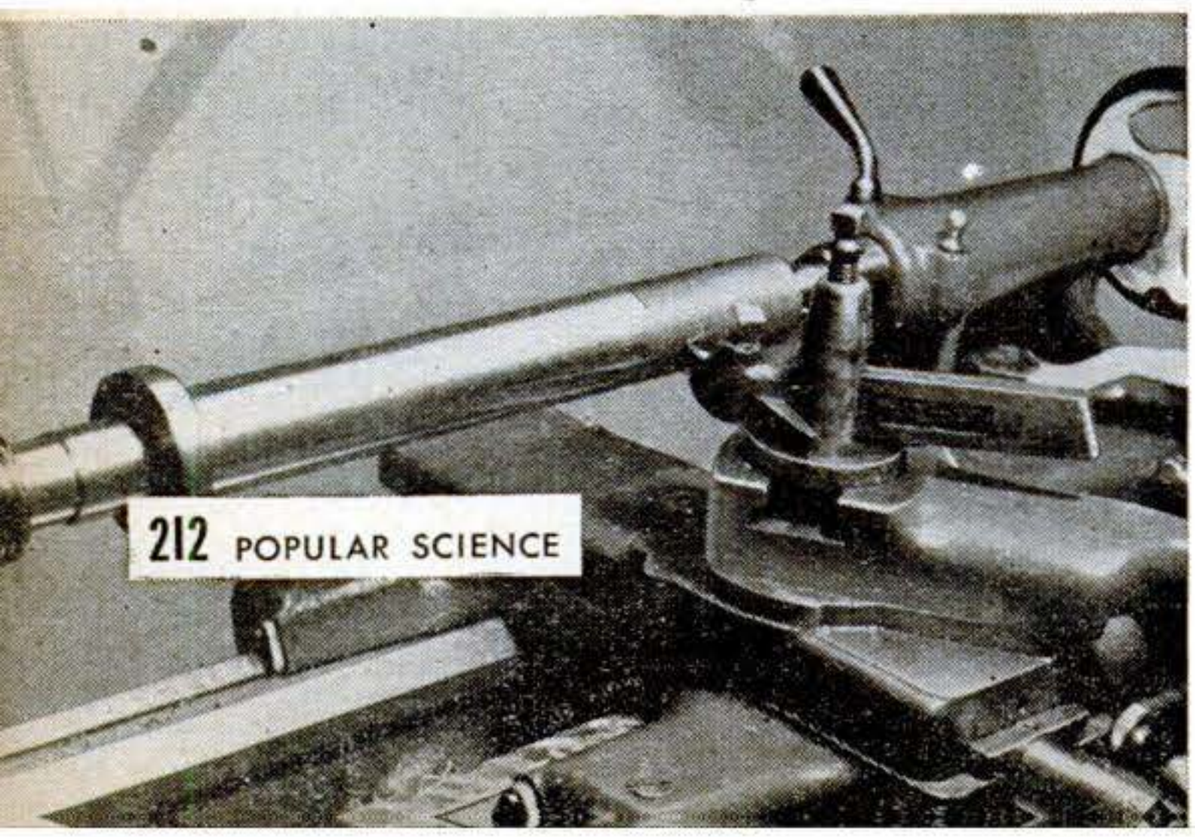


The completed mill set to cut a channel in a steel block. A drill-press vise holds the work.



A tapered hole was bored in the spindle while it rotated in the steady rest, the work being fed by the compound rest set to the taper angle. A lashed lathe dog drives the other end.

Threads were cut on the spindle by mounting it between the tailstock center and a tapered mandrel in the headstock. The same setup was used for machining the spindle to diameter.



Finishing and Setting Up a Bench Mill

Careful lathe work is called for in machining the running parts of this versatile little milling machine.

By Walter E. Burton

MAKING the spindle is one of the most precise operations involved in building the milling machine begun last month. So that the spindle will fit the bearing bores snugly but not tightly, the outside diameter must be held to close tolerances, this diameter being 1.2501″ plus or minus .0003″.

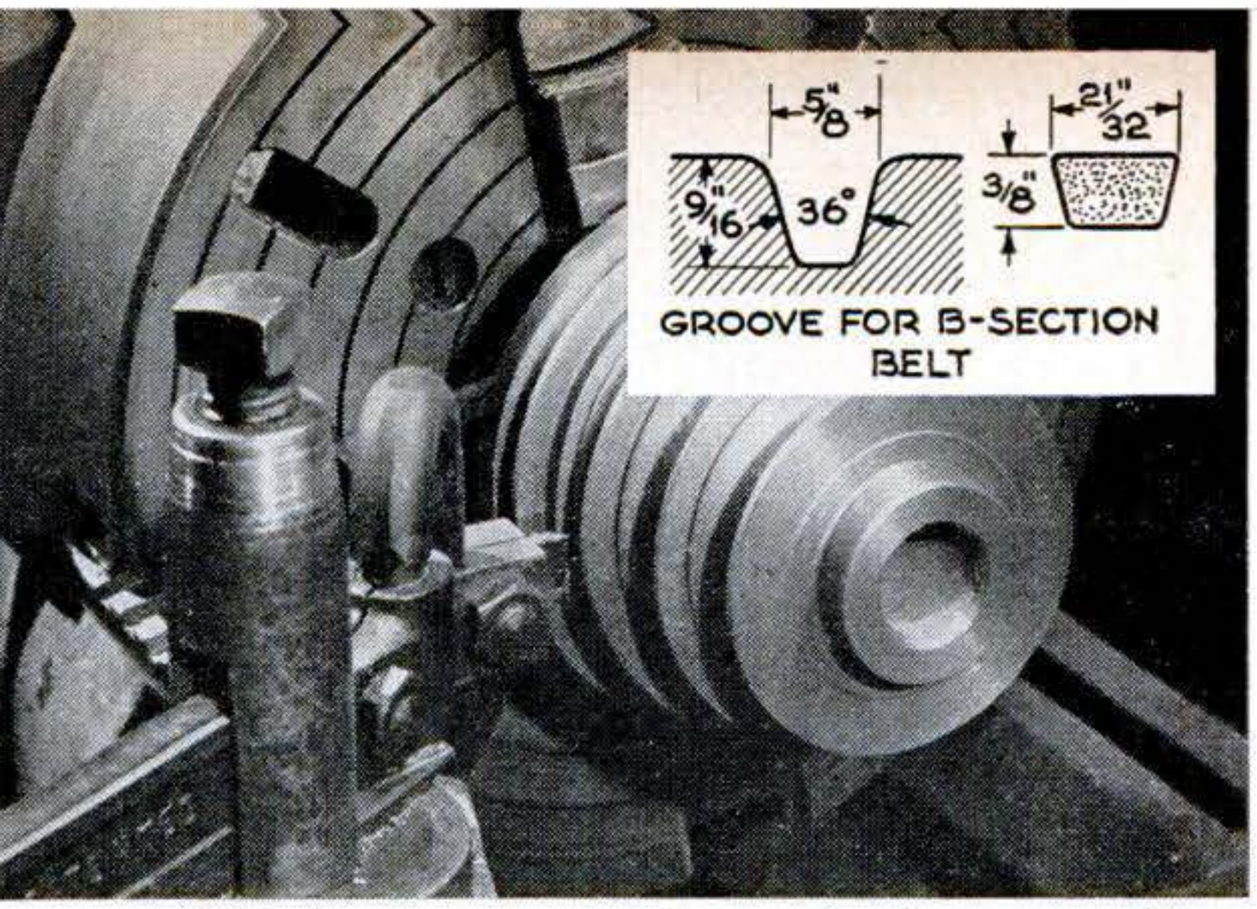
For the workshop fan, such finicky operations are a challenging part of any job. And this one will present several—even though you begin with semifinished castings, as I did, and work from blueprints supplied by the manufacturer. When it's completed, you'll have a machine that opens many new opportunities for your shop—at about a third of the cost of a similar mill bought ready to go.

Make the spindle from steel tubing or rod. At this point came several variations that I introduced to make the mill more suitable for my particular requirements.

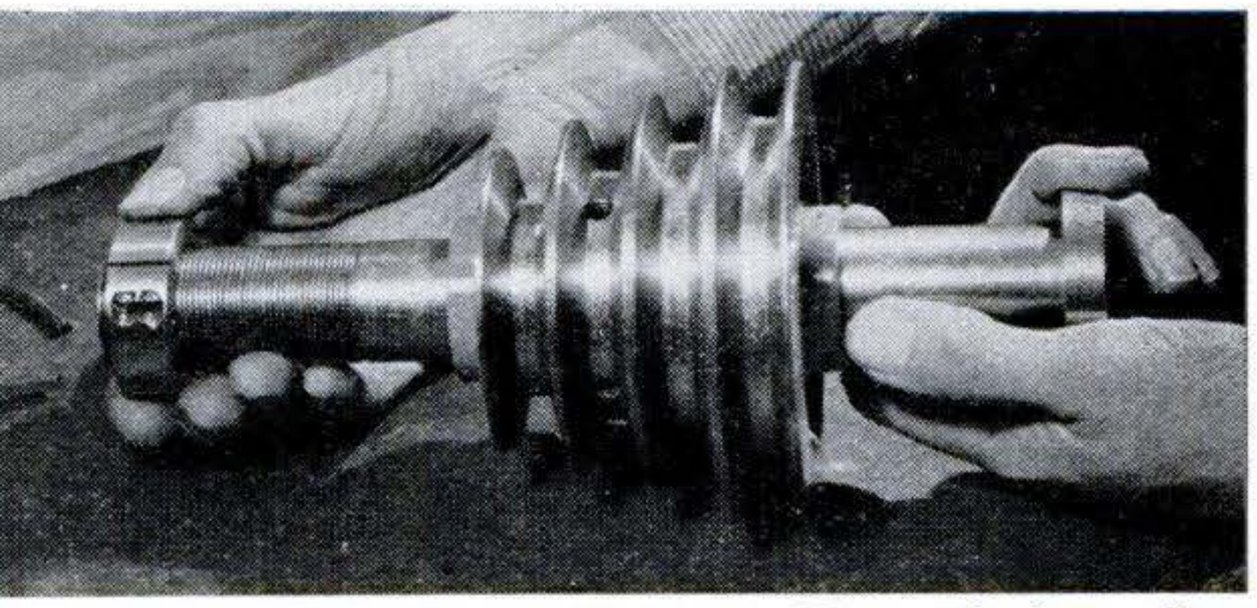
Instead of making the spindle the length specified, I made it 9″ long to give extra thread at the back for later addition of an automatic-feed gear. Furthermore, instead of using two lock nuts on the spindle, I made a threaded ring about ¾″ long, split it with a radial saw cut, and provided two 6-32 fillister-head bolts to lock it on. Such a ring can be adjusted with greater precision for controlling end clearance.

Clean out the recesses bored in the main casting, coat them with a film of thin oil, and tap the bearing cups into position with a plastic hammer or a suitable drive ring. The

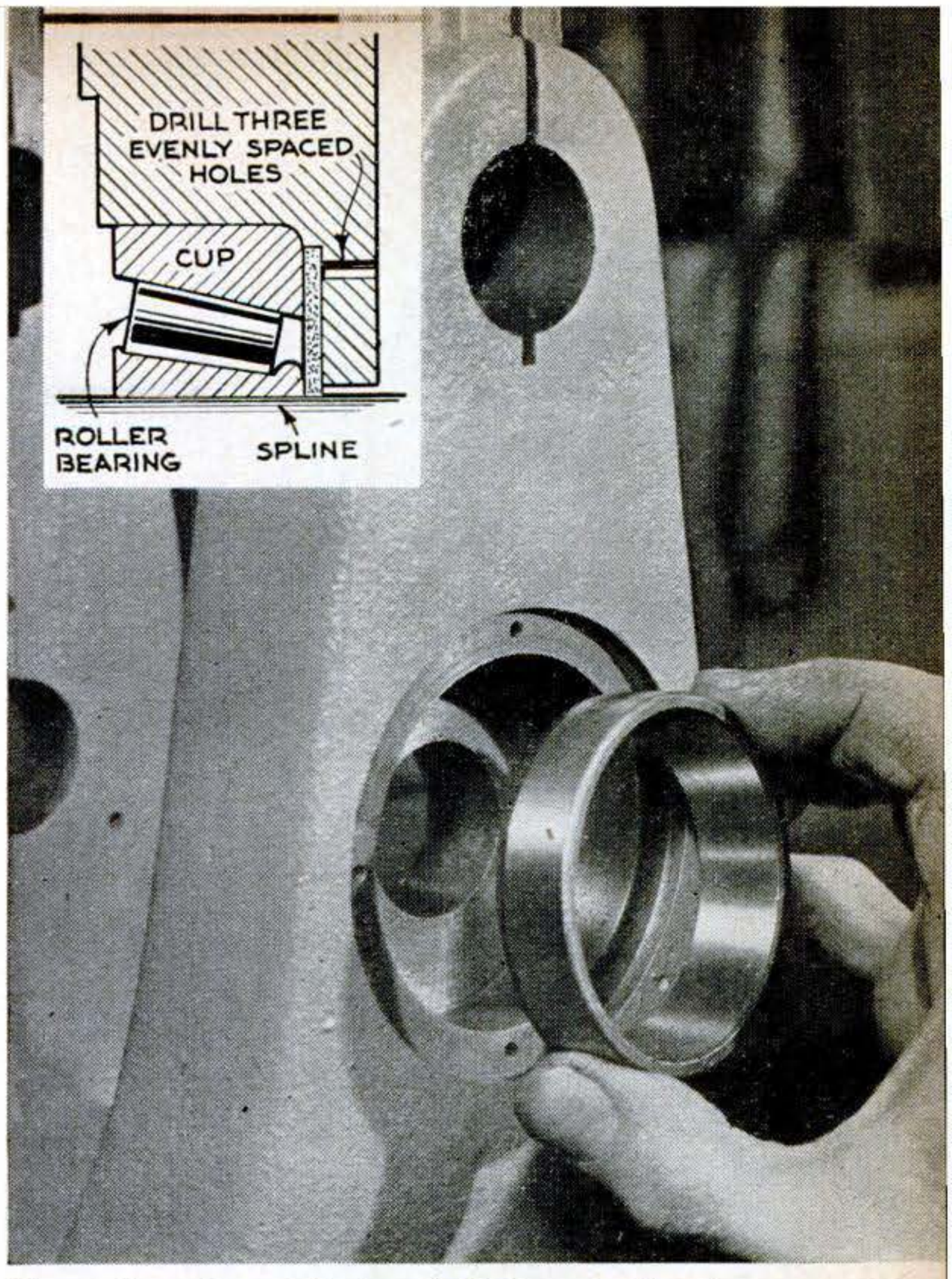
Copyrighted material



V-belt grooves may be cut in the cone pulleys with a cut-off tool. Dimensions suitable for a B-section belt are indicated in the sketch.



Here's the spindle assembly with the pulley in place and the split nut being threaded on. Note the two 6-32 locking screws in the nut. Two setscrews hold the pulley to the shaft.



Three knock-out holes drilled as in the drawing will make the roller-bearing cups easier to remove if replacement is necessary. Coat the recess with oil before tapping in the cup.

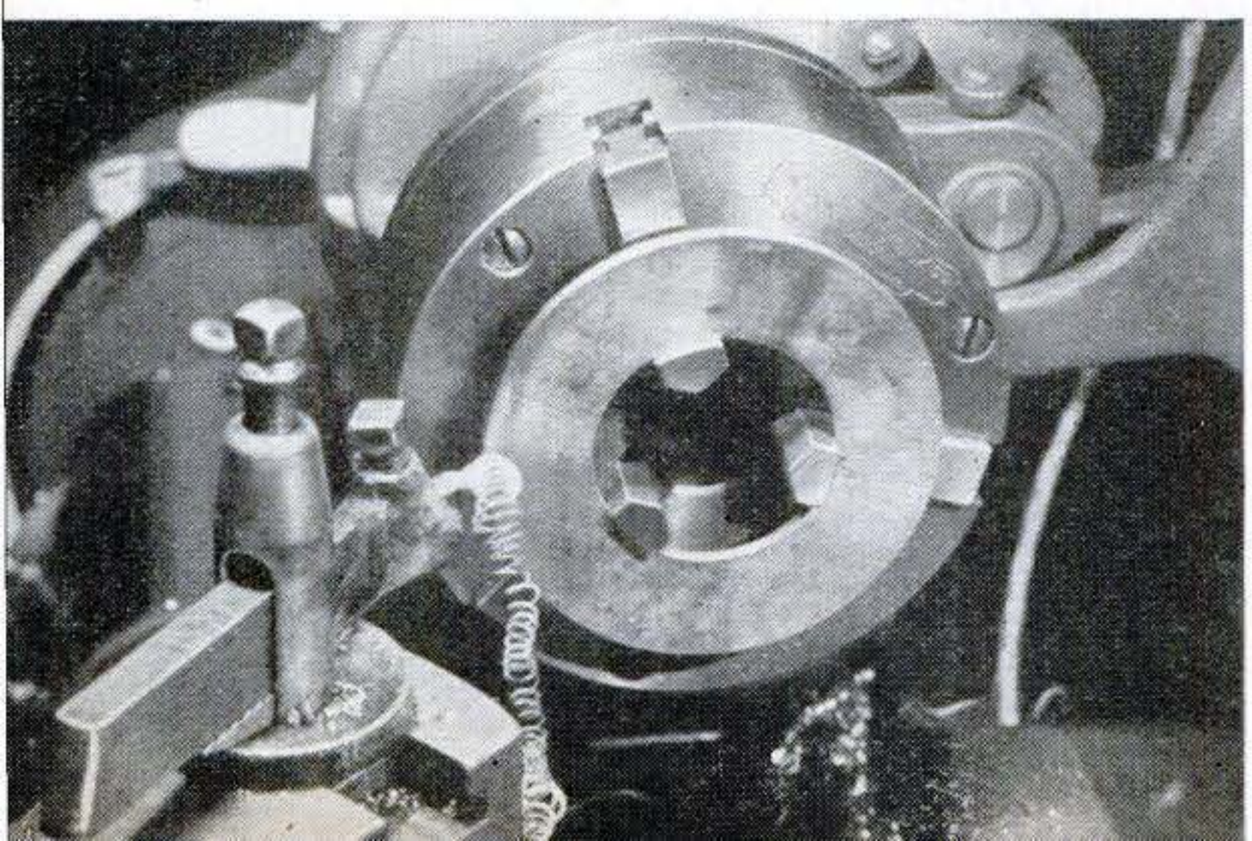
recesses in the casting should be relieved at the inner faces to permit felt dust seals to be installed.

In machining the bearing covers, an improvement is to recess the inner face of each to take a thin felt washer that will form a dust seal around the front end of the spindle and around the retaining nut at the rear. Cement the washers to the cover plates with an oil-resisting adhesive.

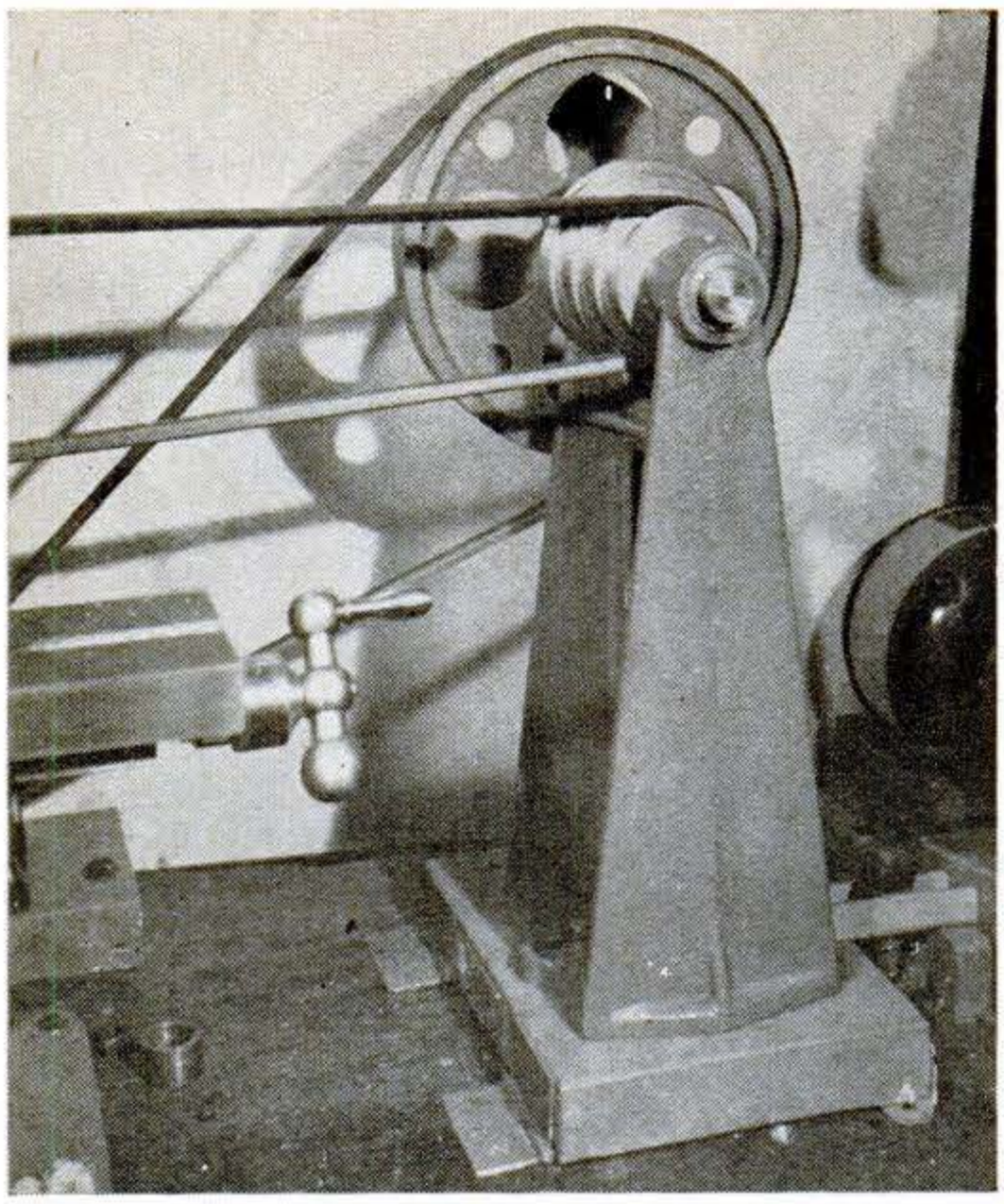
There are various ways of machining the spindle. What I did was clean out the bore to slightly larger than ¾", drive a plug into one end, drill a center hole, and attach a dog. Supporting that end on a center with the dog lashed to the faceplate, I placed the other end in a steady rest and bored a No. 3 Morse taper hole. A steel bar taper-turned to fit the lathe spindle was tapped into it, and a No. 3 Morse taper turned on the protruding end. Then the milling machine spindle was placed so its taper socket engaged the bar, its other end being supported by the tailstock center.

A standard cut-off tool may be used to machine the four-step V-belt pulleys from

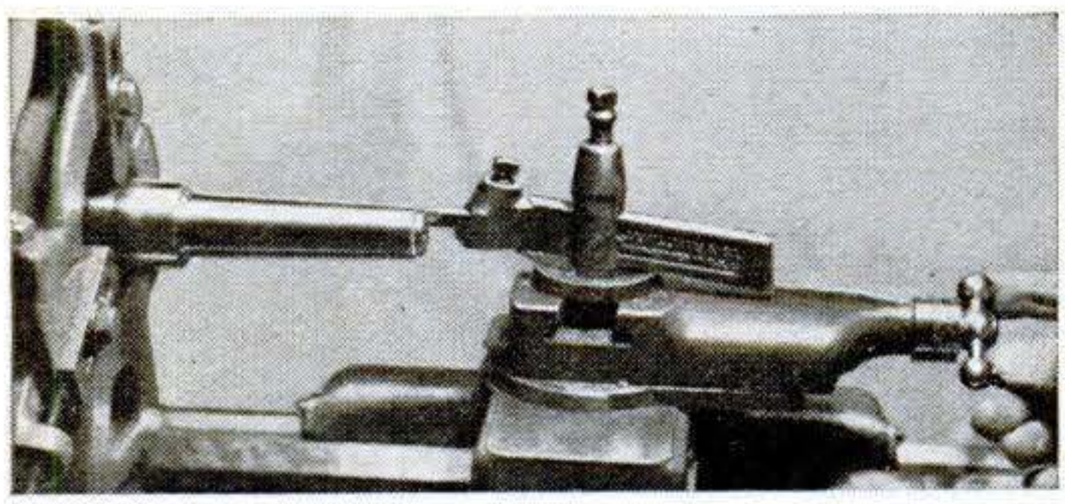
Cover plates for the two roller bearings were machined to the desired outer diameter as seen below. The plates were chucked in outside jaws for machining the inner diameter.



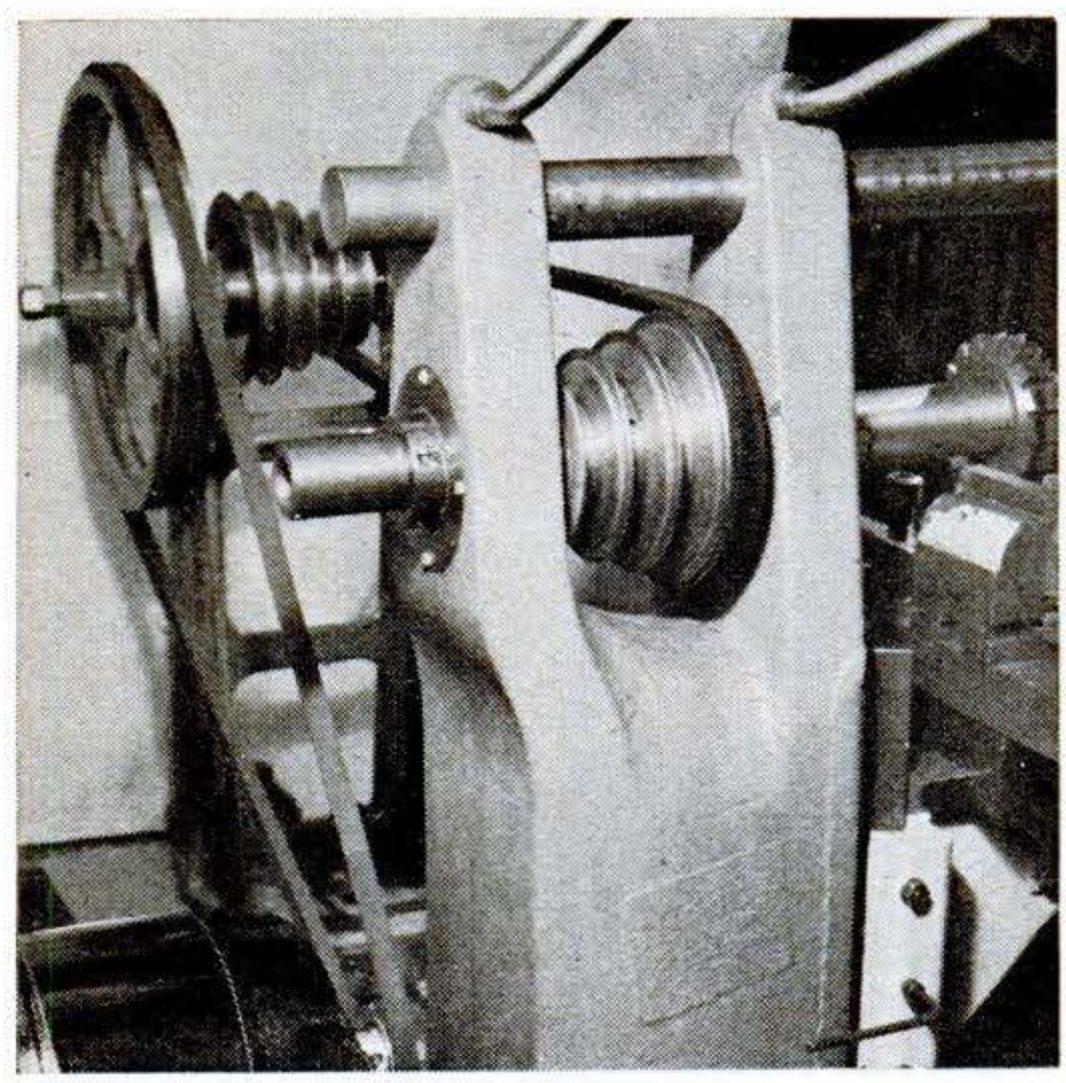
Four screws hold each bearing plate in place, the holes being drilled with the plate itself as a template. The inner face of each plate was recessed for a thin dust-seal washer.



A hinged base makes it possible to swing the countershaft toward the mill to release belt tension. A bolt-button device locks the base.



Taper the arbor at one end to fit the spindle hole of the milling machine. It's desirable to make an arbor for each standard cutter size.



At the rear, the mill looks like this. Use a ⅓- or ½-hp. motor, and for convenience mount the control switch at the front of the bench.

the rough castings, the blade being set to protrude from its holder a distance equal to the groove depth desired. First mount the casting in a four-jaw chuck with the larger end outward. Face off the end and true up the hub portion. Then reverse the casting, with the chuck jaws grasping the hub, and bore the hole to 1¼″ diameter.

Grooves may be formed by making a central cut with the cutoff tool to the depth required, the compound being set at the angle desired for one of the sides. In this case, 18 deg. was used, or a total angle of 36 deg. Feed the compound back and forth to cut one side of each groove. Then reverse the compound and cut the remaining sides.

For maximum trueness, you can mount the sheaves on a true-running mandrel, take light finishing cuts with a sharp bit, and then file and polish. Although each sheave should be keyed to its shaft for maximum strength, two 5/16″ setscrews placed 90 deg. apart to engage flats on the shaft will be adequate for most purposes. The screws extend through the second smallest groove.

One of the cone pulleys is mounted on a shaft that rotates in plain holes bored in the countershaft casting. In semifinished castings, these holes are already bored. But if you're using a rough casting, you can bolt it to the carriage of the lathe and drill holes about 1″ diameter. Then mount a boring bar between centers and bore the holes to size by adjusting the cutting bit outward for successive passes. Also face off the areas around the holes so the pulley ends will have true bearing surfaces.

You probably will find it advisable to obtain the large countershaft pulley wheel already turned and reamed, for in the rough state it is a bit hefty for a small lathe. Along with a V-groove sheave on the motor shaft and an A-section or B-section belt, this wheel forms a V-flat drive. If you wish you may substitute a grooved sheave on the countershaft, producing a full V-drive.

Although a collar is indicated for the countershaft, the two pulleys will hold the shaft in position if the casting is faced off so they run smoothly. Considerable end play is permissible if the two cone pulleys are aligned properly, the "floating" action sometimes being quieter than a tight fit. The ratio of the motor and countershaft pulleys may be about 7:1.

Because a V-belt should always be slack when it is changed from one cone-pulley groove to another, the countershaft in this

Copyrighted material

case was mounted on a heavy wooden base hinged along the edge nearest the mill and provided with a hold-down arrangement at the opposite edge. This consists of a bolt installed in the bench top, a button made from channel steel, and a supporting block.

Slots in the base of the countershaft casting permit it to be shifted to offset belt stretch. However, the tilting arrangement could be designed to perform this function by blocking up the button-edge initially with a strip of wood that is, say, ½" thick. As the belt stretches, substitute thinner strips.

End mills may be mounted by grasping their shanks in collets tightened by a drawbar extending through the spindle, exactly as in a lathe spindle. A keyed chuck on a No. 3 Morse taper arbor will hold small end mills, drill bits, etc. Always lock the chuck in the spindle by a drawbar. This may be a ¼" threaded steel rod engaging a threaded hole in the end of the arbor, the other end being equipped with a handwheel bearing against a sleeve in the spindle hole.

Standard milling cutters like those seen in some of the photos are usually mounted on an arbor tapered at one end to fit the milling-machine spindle hole and turned at the other to a ½" diameter to fit the bronze bushing in the overarm bracket.

Collars to space the cutters on the arbor are best machined from steel tubing. They should be of various lengths. It is important that the ends be faced off square.

Oil the overarm bearing each time you insert an arbor into it. Also remember to oil all other parts of the machine frequently. The spindle bearings should be packed with lubricant designed for roller bearings.

When the machine is ready for a trial run, check it carefully to see that everything is performing with the required precision.

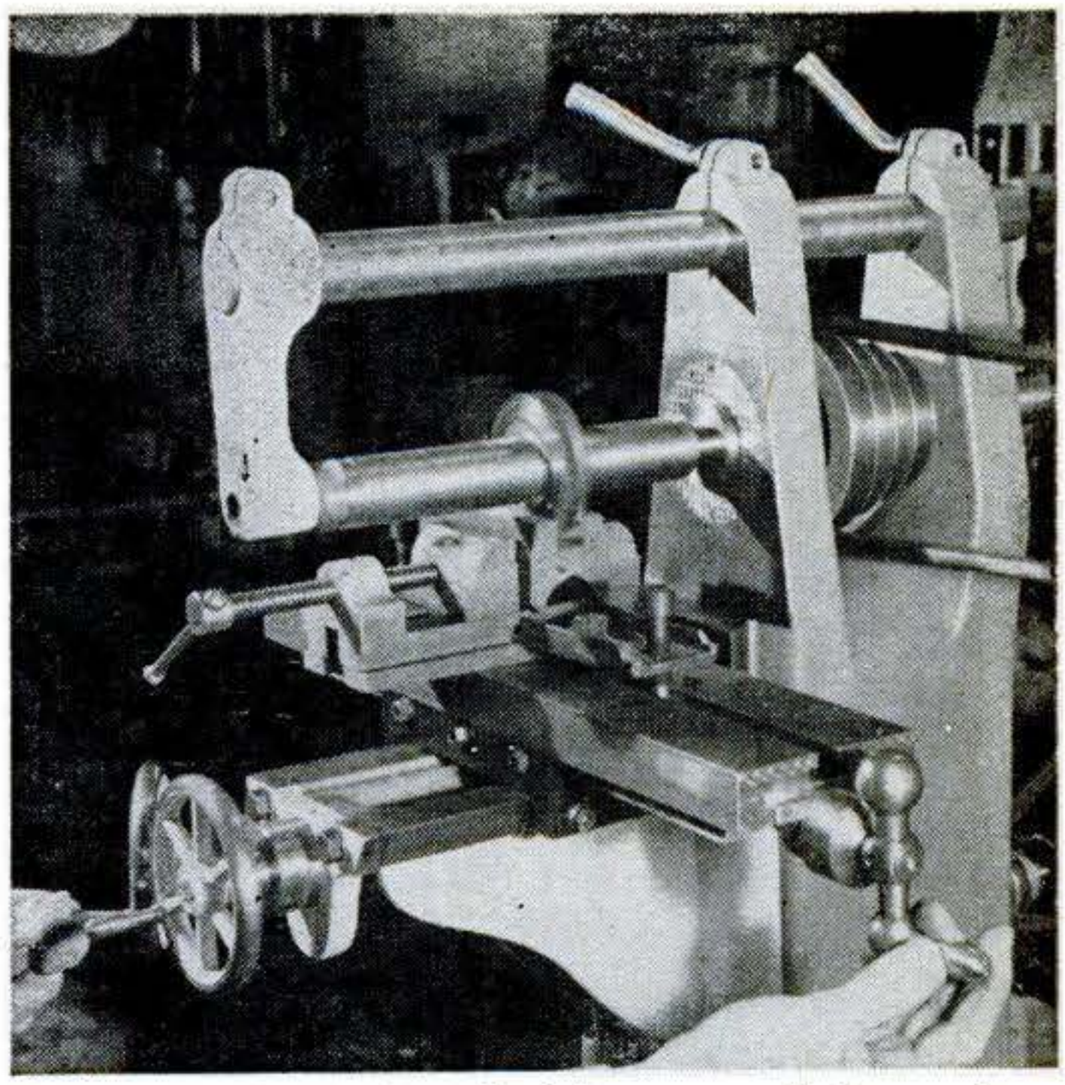
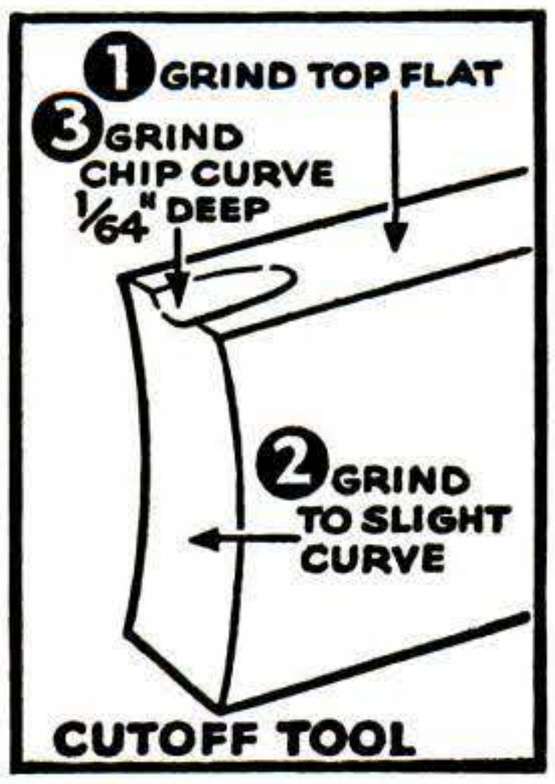


Table feed is controlled by a crank located at the right-hand end. However, the crank may be placed at the other end if you prefer.

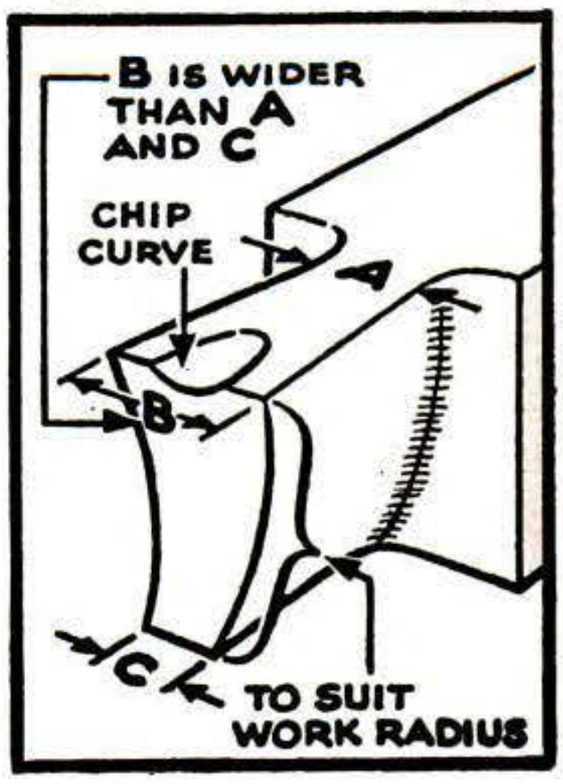
Here a dial indicator is handy, for it can be mounted to gauge the trueness of table travel, etc. You can bring the dovetail slides to a high degree of perfection by careful manipulation of a metal scraper and judicious use of abrasive cloth and sticks. Adjust the gibs so the parts move with minimum of play, but do not bind. The center gib screw of the vertical slide should have a handle or knob so it can be used as a locking screw when occasion requires. Equip all other gib screws with lock nuts.

Work is held on the table by a standard milling vise, or by any other suitable clamping arrangement. In the setup shown on page 212, a vise is held by two pivoted steel plates, the center pivot being a bolt whose head engages the T-slot. The outer ends are supported by cap screws pressing against the bottom of the slot. END

Cutoff and Trepanning Tools Break Up the Chips



EVERY machinist has run up against the bugaboo of chips clogging the slot while a cutoff or trepanning tool is being used. I have found that tools ground as shown in these sketches give excellent results. If mounted just a trifle above center, the slight curve on the cutoff tool avoids chattering and digging in. In either tool, grind the chip curve 1-64" deep or less—never more. The trepanning tool was made from a tool bit. If the heel drags, grind a trifle to provide clearance.—*R. J. Wright, Bartow, Fla.*

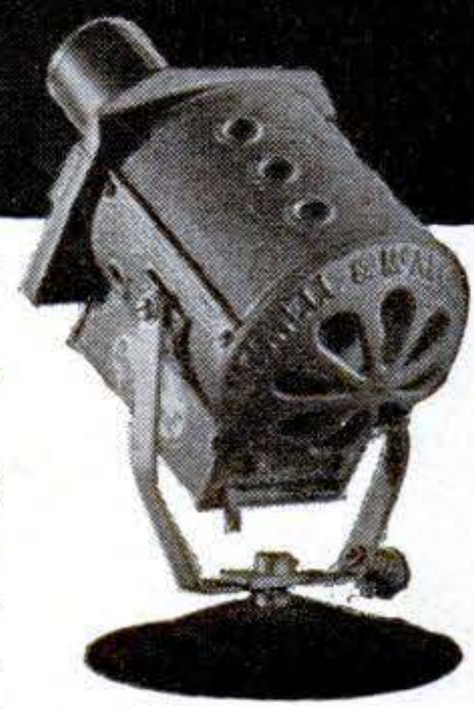


Copyrighted material

Shoot with One Light

If carefully placed, a single spot will yield portraits with dramatic shadows and brilliant high lights.

By Louis Hochman



A midget spot with a "snoot" to narrow the beam will yield shots like this.

CONSIDERING the variety of spots, floods, booms, and other lights used in making a single big-time advertising picture, an amateur photographer may wonder how he ever could hope to do good work with his own limited supply of lighting units. Yet some of the most striking pictorial effects are produced with just a single light.

One light, judiciously applied to a subject, packs a wallop that is hard to maintain when more are introduced into the composition. The strong contrasts between light and dark areas, the dramatic shadows and brilliant high lights, and the simplicity of composition all tend to heighten the effect and make the picture more forceful.

One-light photography is good training for more advanced work. You are forced to try all possible angles until you find the one that yields the best result. In this way, you unconsciously develop your skill in placing the key light.

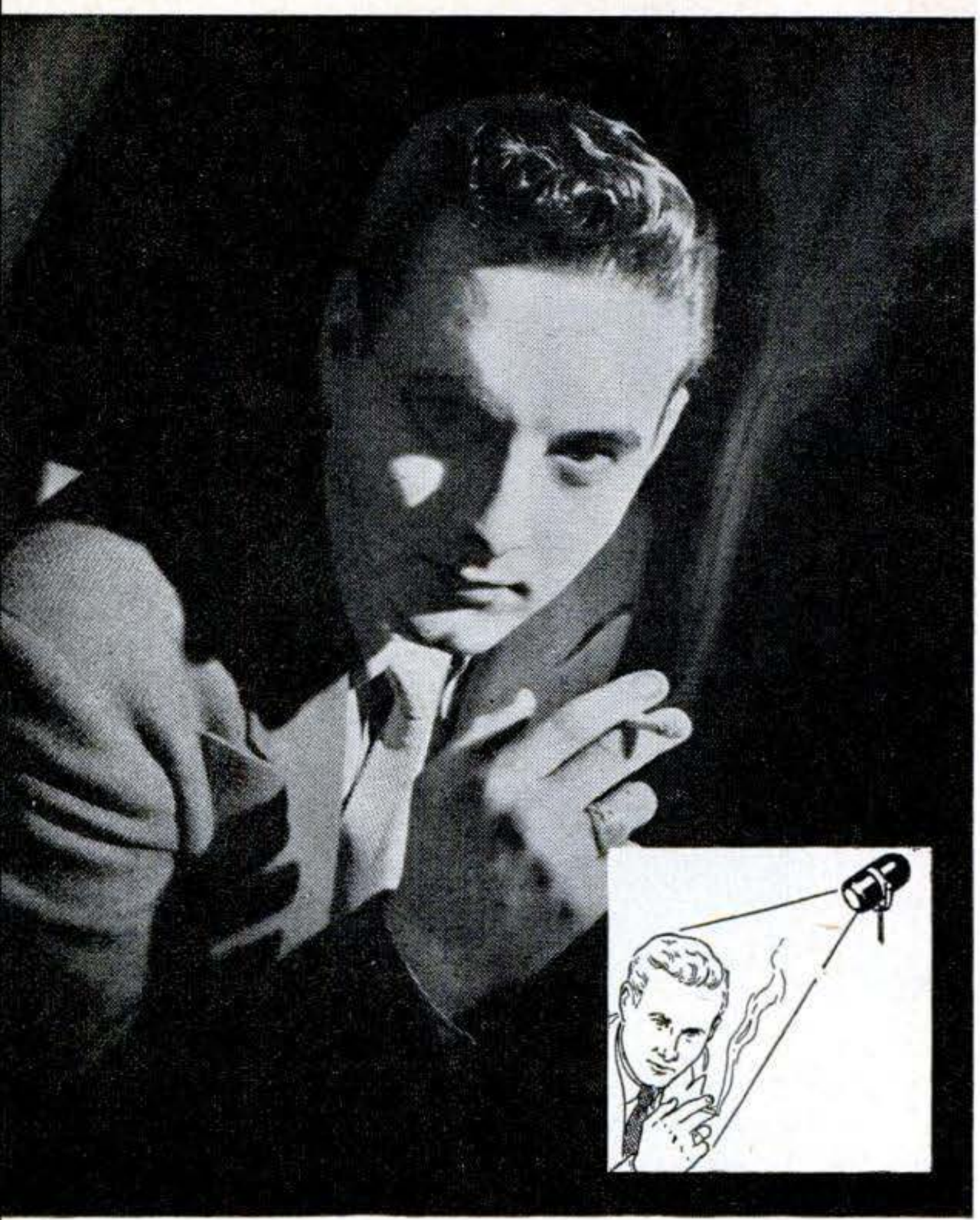
You can use any spotlight from the large studio variety down to the tiny Dinkie Inkie Ⓣ, or even a reflector-type flood. To control the beam of a photoflood, roll a tube about 10″ long from thin cardboard and slip this over the bulb. Don't burn the light too long or the tube may catch fire. Use a "snoot" to narrow the beam of the spotlight.

By posing a subject against a black background and training the beam of a midget spotlight on his features from various angles, you can produce a variety of effects. For such shots be careful of the nose shadow. If it reaches the mouth, the effect usually will be unsatisfactory, and it's generally best to angle the light so the shadow covers only about a third of the distance between the nose and the upper lip.

You frequently can glamorize a girl model by directing the light straight into her face from directly in front, regardless of the direction in which her head is turned. Weird effects can be achieved by placing the spotlight on the floor with its beam on the subject's face, and interesting profile shots by edge-lighting your subject from behind. In the latter case, be careful not to let the light strike directly into the lens.

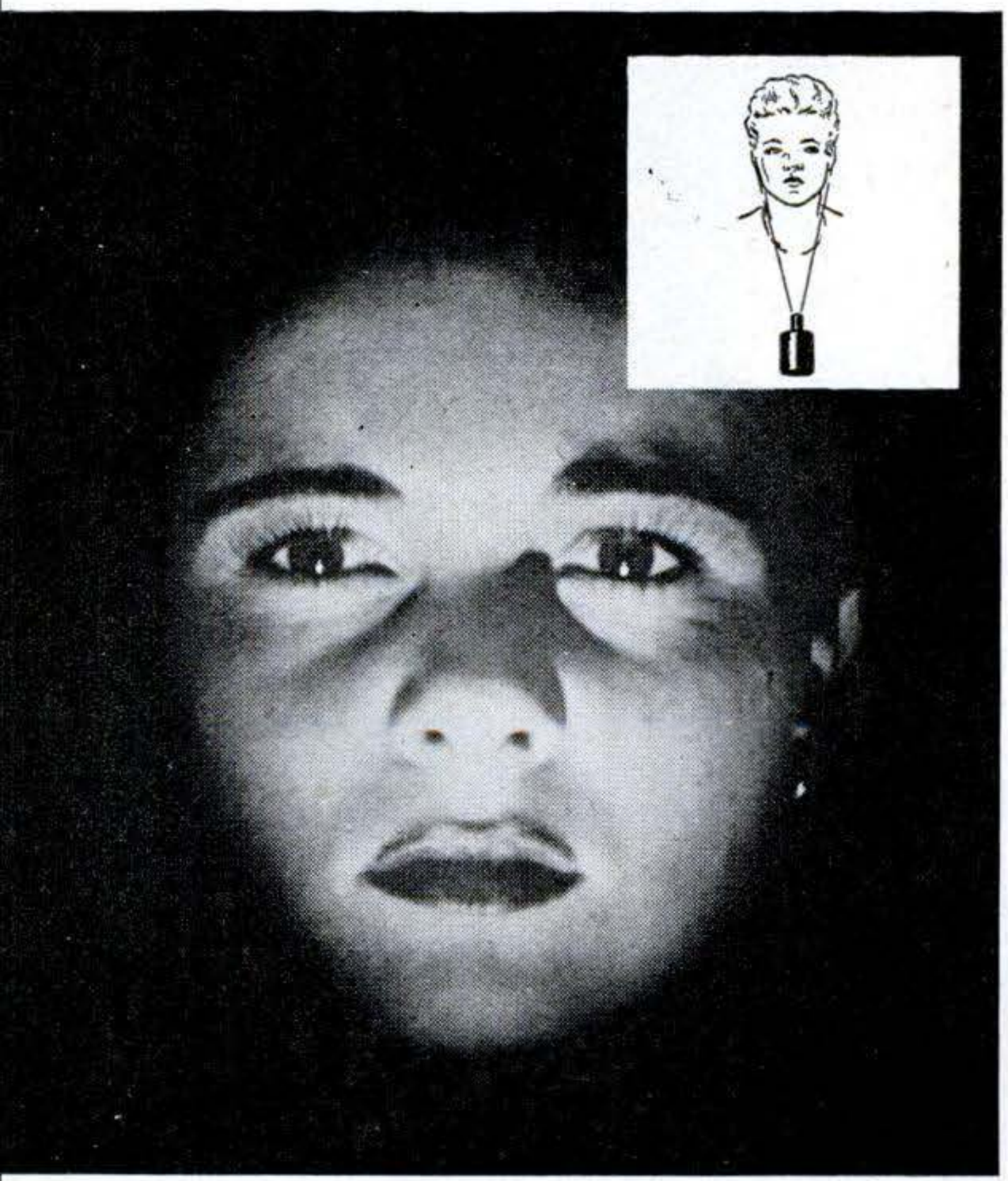
In most cases, especially if black backgrounds are used, one-spot photography will yield fairly contrasty negatives. For this reason, it is a good idea to process the films in a soft-working developer. END

Copyrighted material

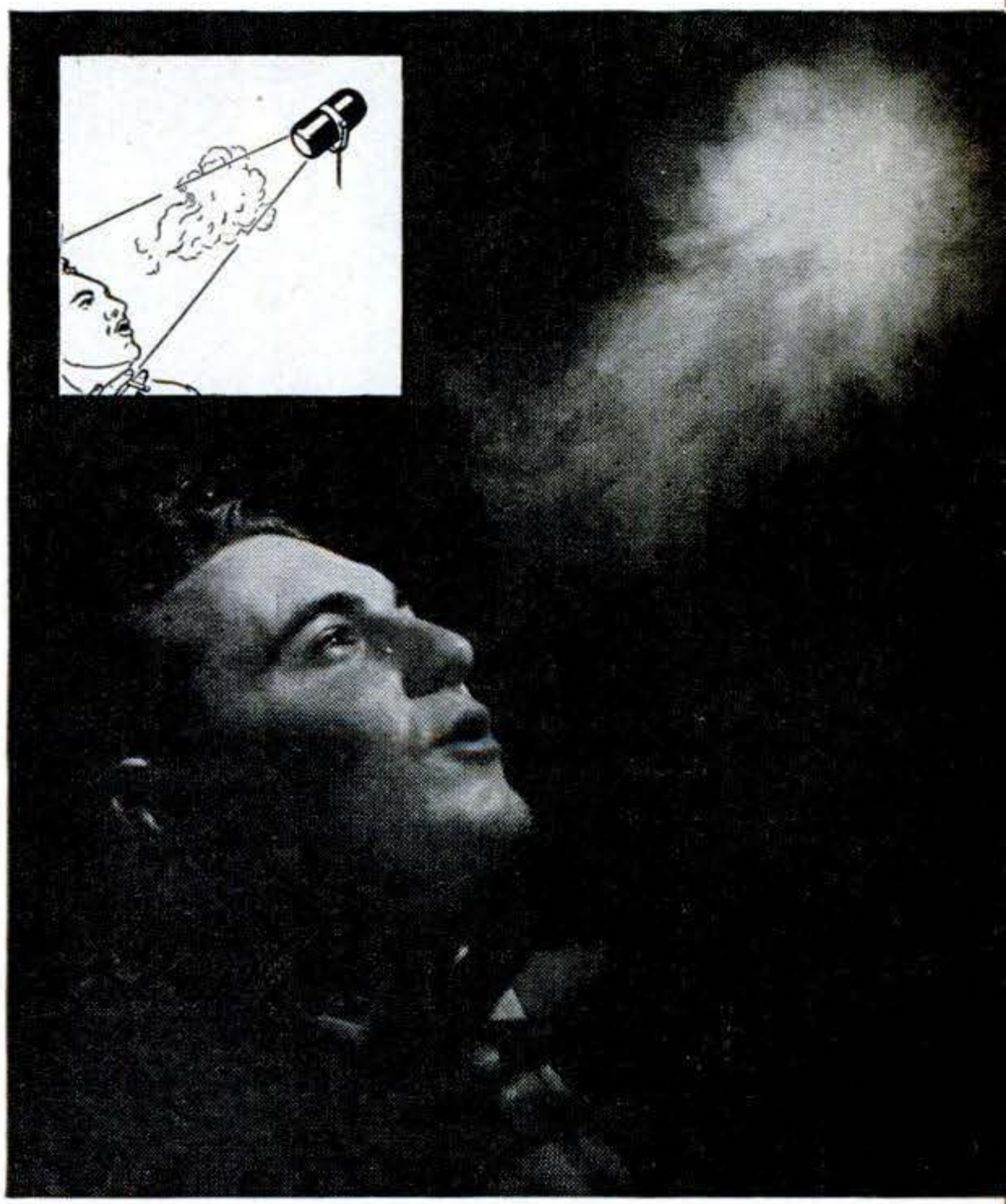


Dramatic shadows help heighten the effect of some shots. The sketch shows location of spot.

A reflector photoflood, placed high, illuminates the upturned face of this young pilot.



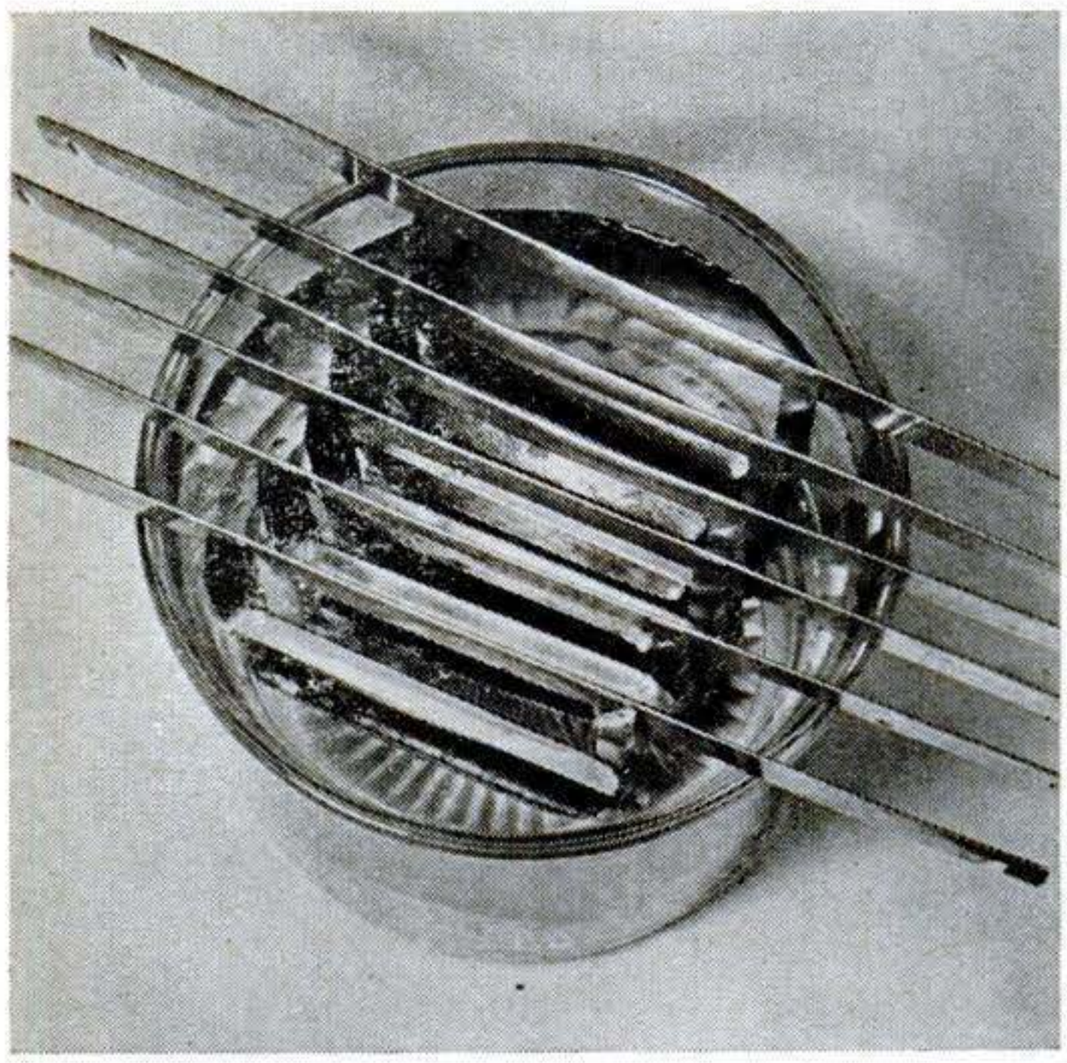
A narrow beam of light from a snooted spot placed below the camera was used for this one.



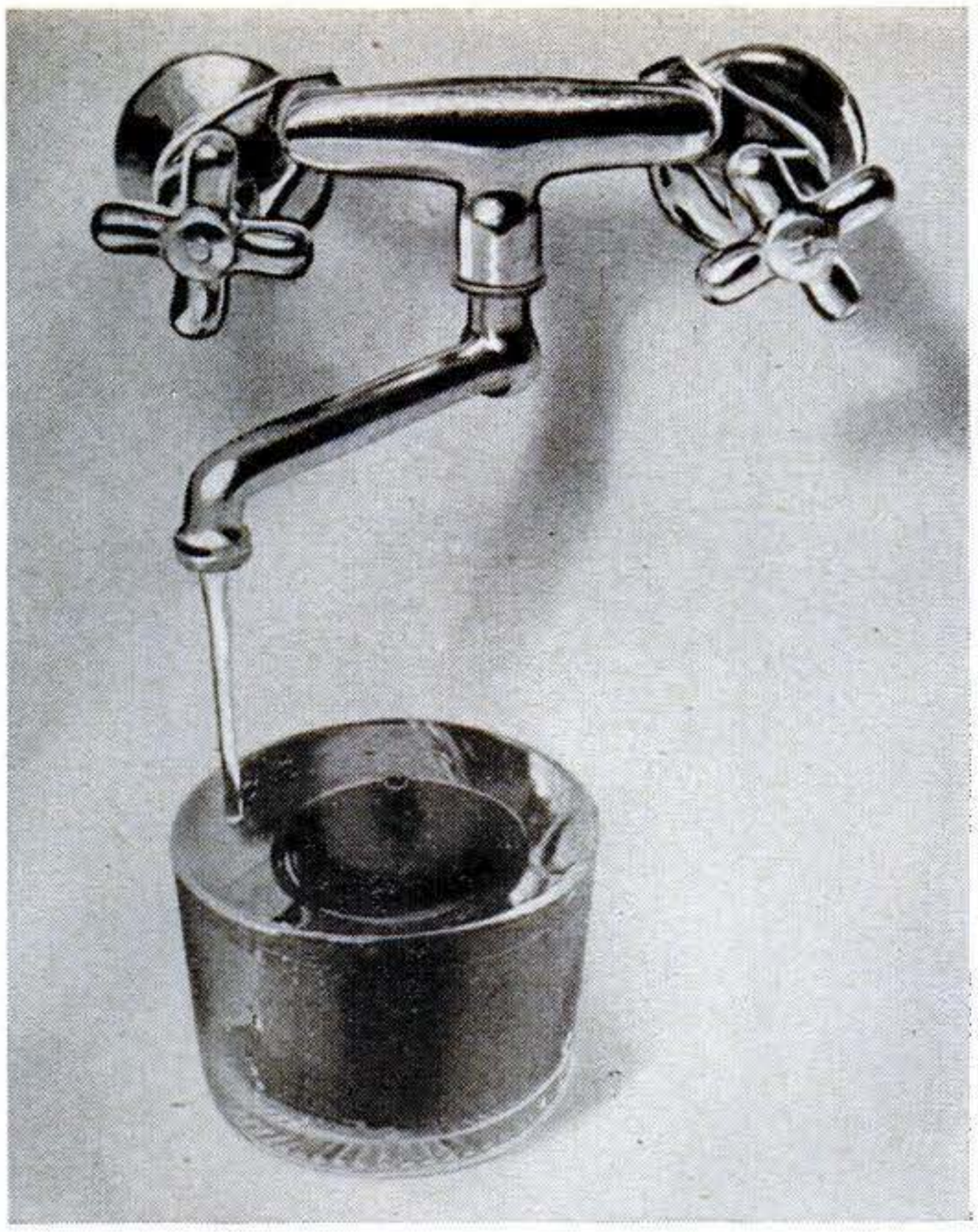
Many unusual effects are possible. Here, the light hits both the model and a puff of smoke.

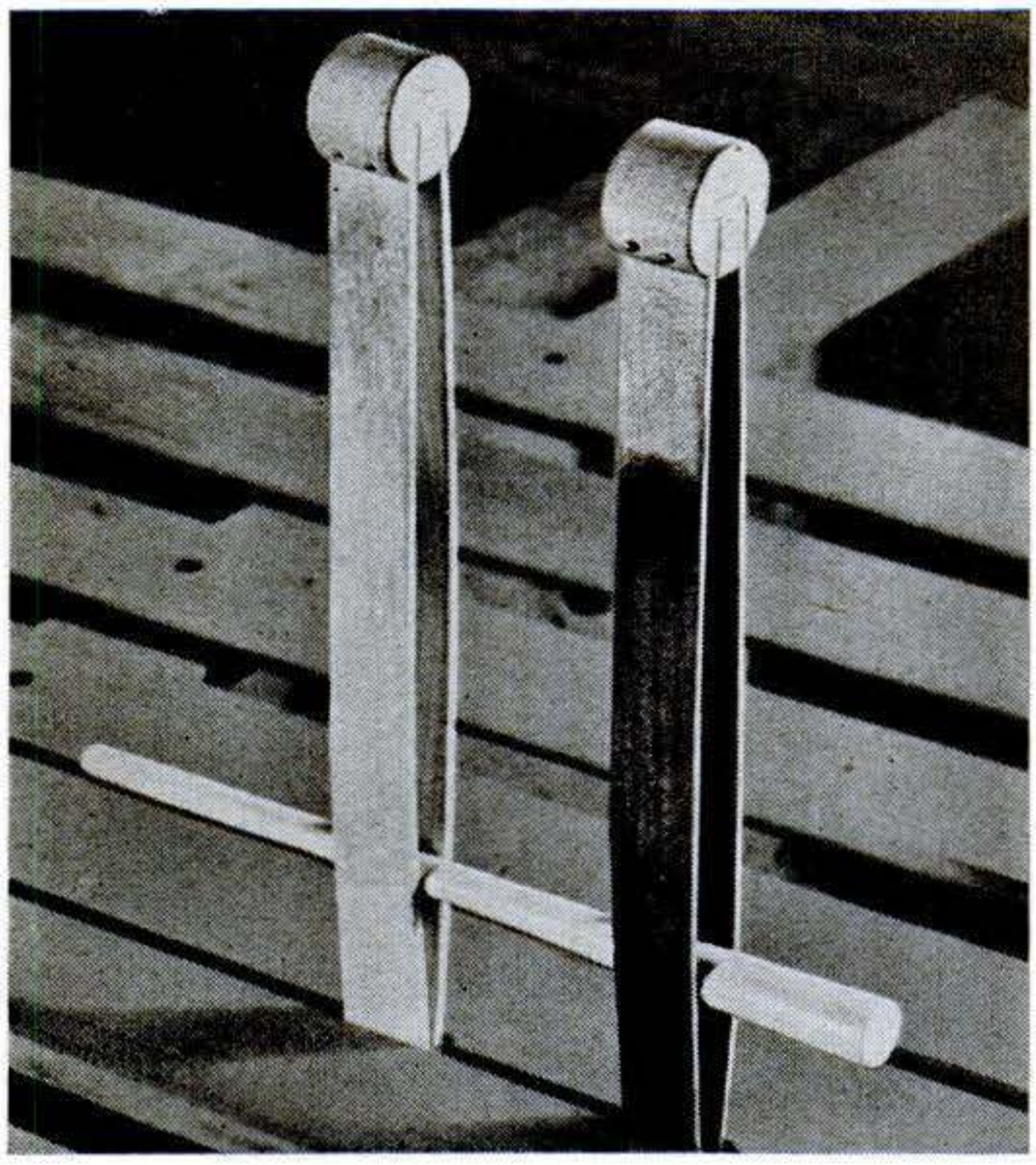
Copyrighted material

PHOTO IDEAS AND EQUIPMENT

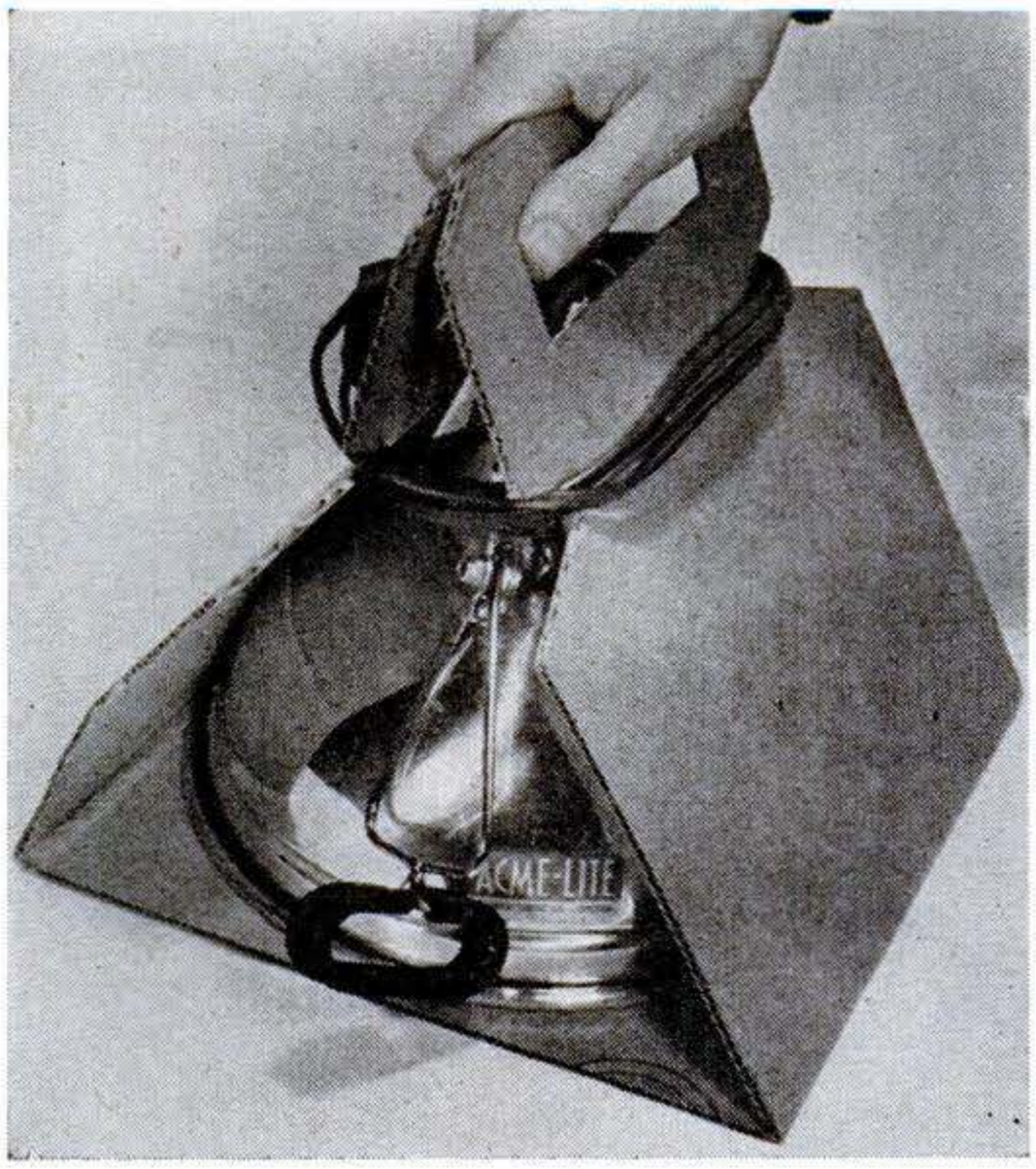


Bowl Is Developing Aid. A quart-size glass ice-cube bowl is a handy darkroom accessory. Accommodating half a dozen 2¼″ by 3¾″ hangers, it may be substituted for a cut-film tank in all developing steps. It also enables me to increase the effectiveness of my roll-film tank. While one reel of film is washing, a replacement reel can be loaded and development begun.—*Jack Wilson, San Pedro, Calif.*



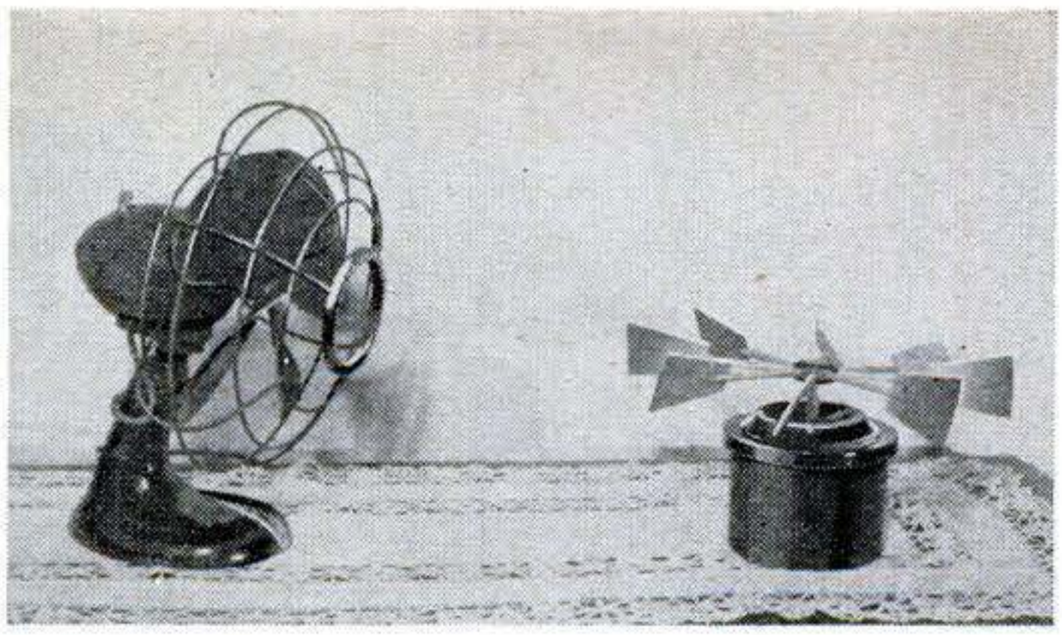


Tongs Strengthened. The holding power of wood print tongs can be improved by drying them with the tips inserted in a crack, and a stirring rod or pencil wedged between the prongs. When dry, the tongs will be bowed sufficiently to grip prints better.—*Glenn A. Wagner, Delmar, N. Y.*

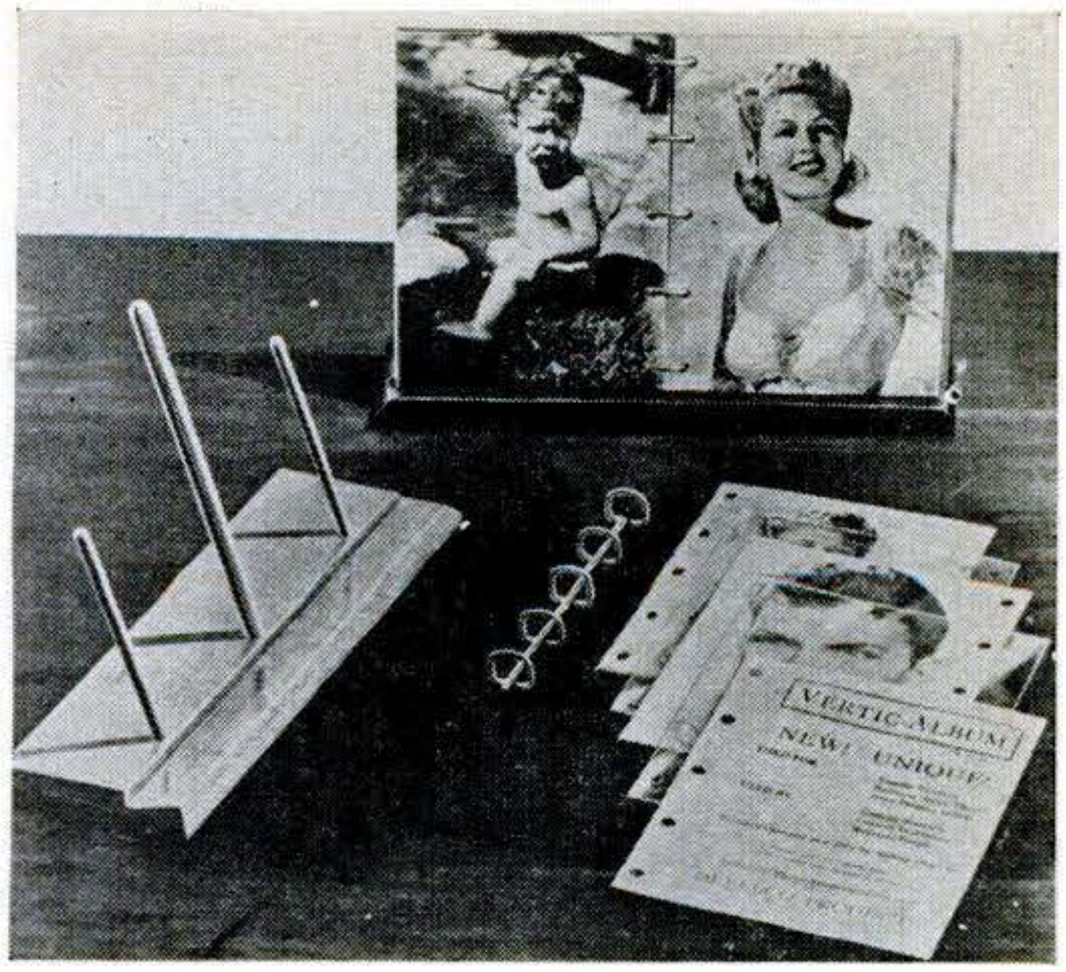


Carrier Made for Reflector. Heavy cardboard cut and bent like this will enable you to carry a reflector with ease. Cut the center square 2″ larger than the reflector diameter, cut holes in the ends, bend up against the reflector, and loop the cord around.—*Henry Hanscom, Elmhurst, Ill.*

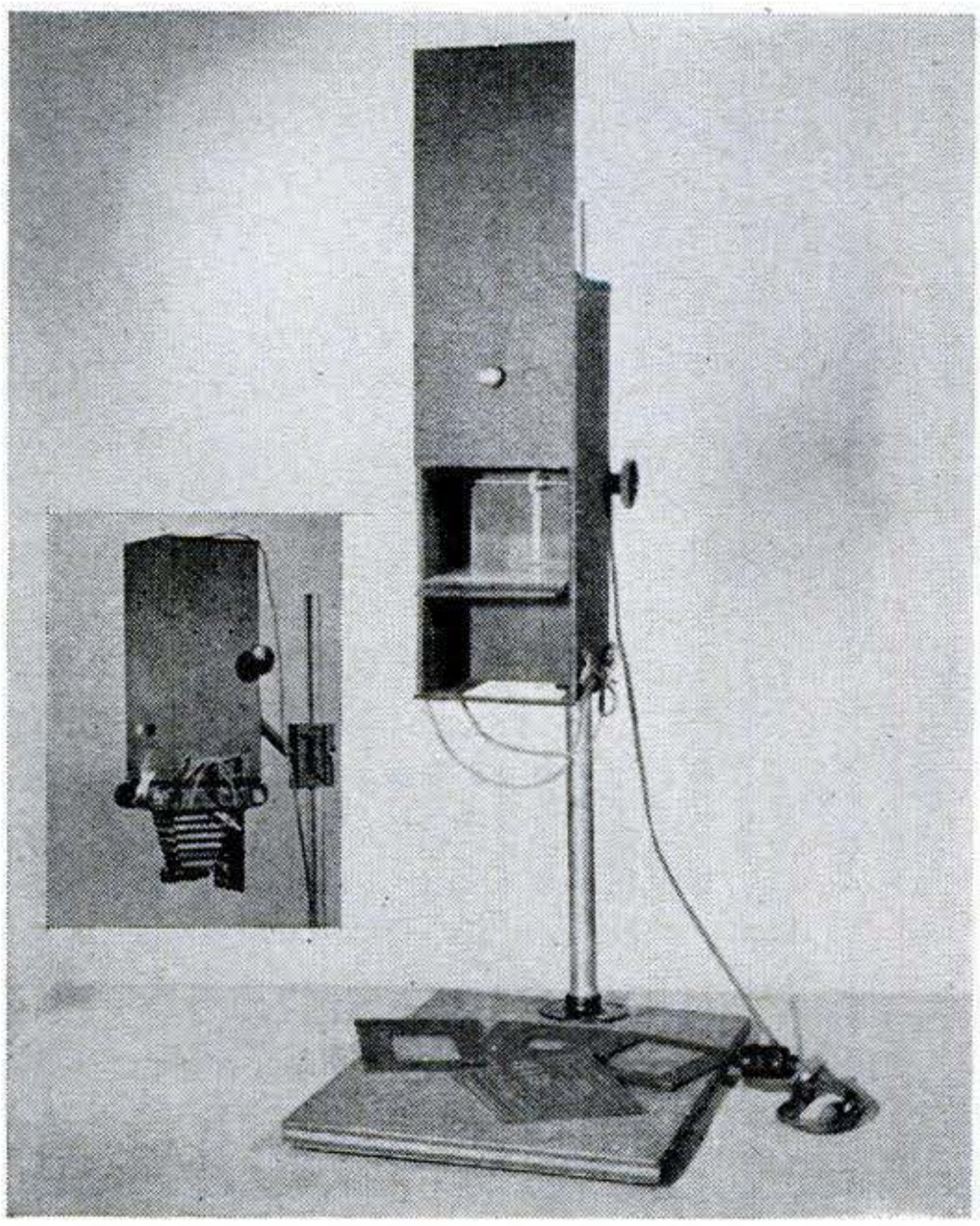
Copyrighted material



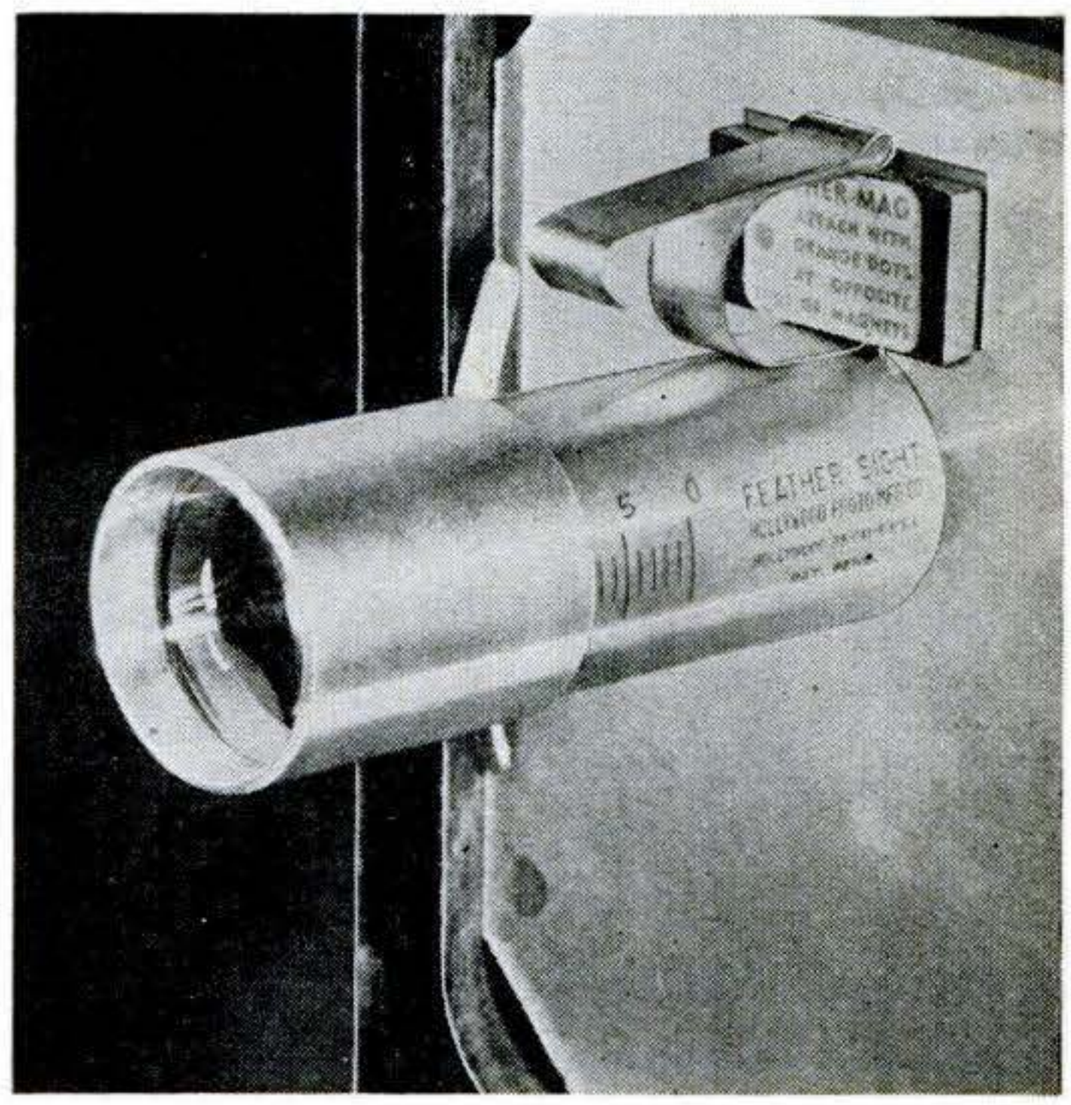
It's a Breeze. A little windmill and an electric fan do the agitating for me when I use my roll-film developing tank. Cut from light cardboard, the windmill blades were glued at an angle into the outer ends of dowels attached to a central hub, and a wood shaft was pressed firmly into the reel shaft. Speed of rotation may be adjusted by varying the distance from fan to tank.—*Burton Byler, Melrose Park, Pa.*



Stand Supports Album. A display stand is provided with a new album marketed by Develco Products, of Norwalk, Conn. Five clear-plastic envelopes accommodate ten 5″ by 7″ photos back to back or a larger number of smaller ones mounted on 5″ by 7″ sheets. The ring holder slips over the center rod on the stand.

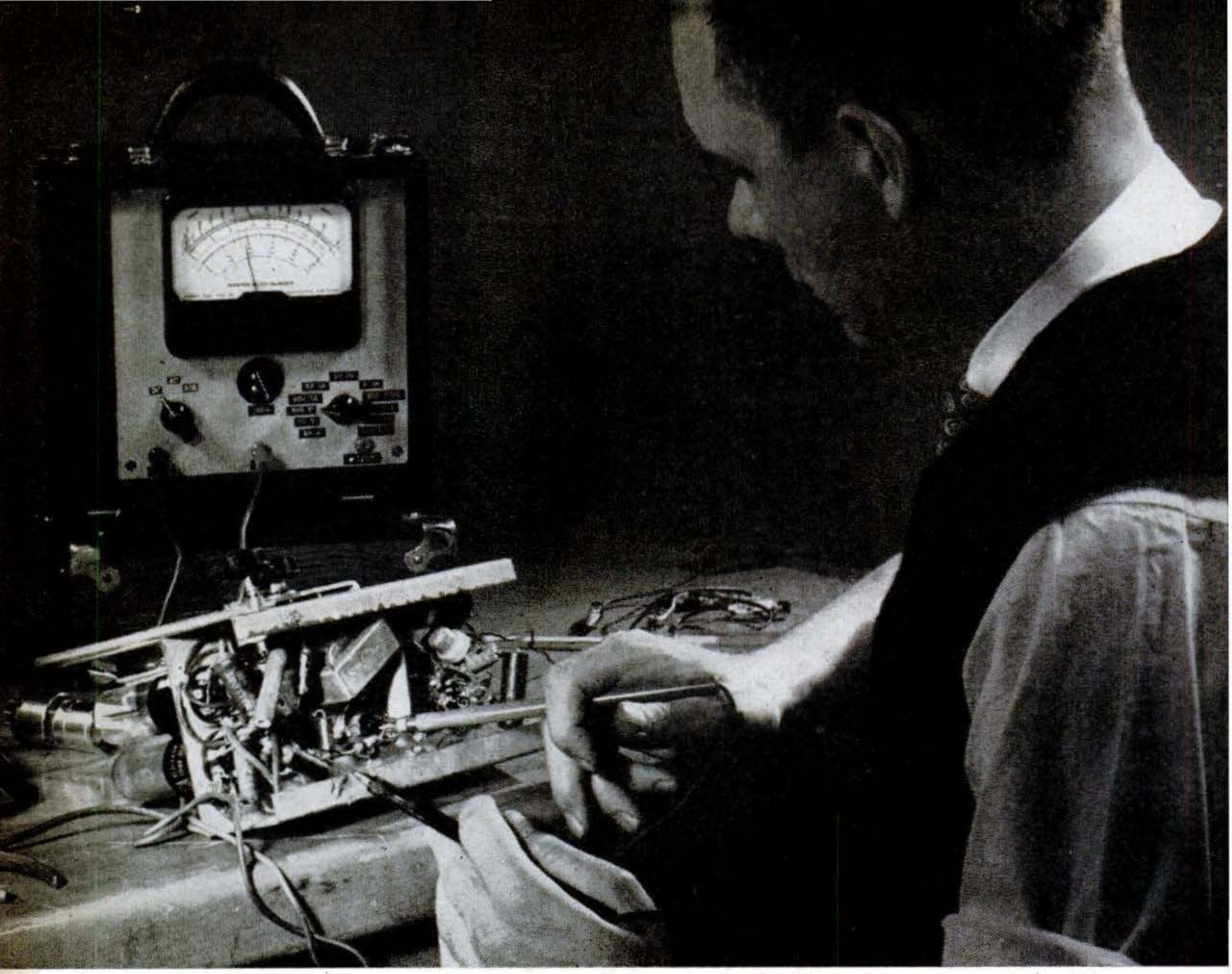


Enlarger Uses Camera. In an enlarger offered by Engineered Products Company of Cincinnati, focusing is accomplished by moving the negative rather than a lens. This makes it possible to use any camera with the enlarger, even one of fixed focus, if the back is removable or opens 180 deg. Negatives up to 4⅜″ by 5⅛″ are placed in the carrier by sliding the front of the lamp housing upward. A knob racks the carrier up and down to focus. The enlarger retails for approximately $20.



Magnets Hold Focusing Aid. Two permanent magnets, one placed inside the ground glass, keep this focusing device in any desired position on the glass. A product of the Hollywood Photo Manufacturing Co., Hollywood, Calif., it consists of a four-power magnifying lens mounted in a telescoping aluminum tube. Since practically all back light is excluded, the device gives sharp focus without a cloth. A scale on one side allows you to reset the tube at a previously determined focus.

Copyrighted material



A voltmeter check of a receiver is the most efficient method of locating causes of trouble.

Completing the Beginner's Set

Here are further pointers on wiring, aligning, and checking a superhet that anyone can build.

By a High-School Shop Teacher

ONCE you get to know your way around radio you'll find that there are only two things you really need to complete any building project: a schematic diagram and a parts list. Photographs, description, and pictorial diagrams are "extras" like a radio and heater in a car. You can get where you're going without them, but they sometimes make the trip more comfortable.

Since all the essential information was given in the first part of this article last month, you may have completed your five-tube superhet. Assuming that you have, and that it's working to your complete satisfaction, you need only file this installment for future reference. Radios do break down, and when they do it is comforting to know the most likely places to look for trouble.

If on the other hand you have waited to become thoroughly familiar with the project before heating up your soldering iron, you may be interested in more construction tips.

Most connections in a radio circuit end up at the tube sockets, so it seems reasonable—for the beginner at least—to start with the five octal sockets and make them the heart

Copyrighted material

of the wiring schedule. It may be helpful to indicate the manner in which connections are made to a typical socket. Let's take the 12A8, because it is probably the most difficult of the lot.

Remember that pin numbers are counted clockwise from the keyway in the center when you are looking at the underside of the socket. Prong 1 is a shield pin and it can either be left alone or grounded to a mounting screw and used as a lug for nearby ground leads.

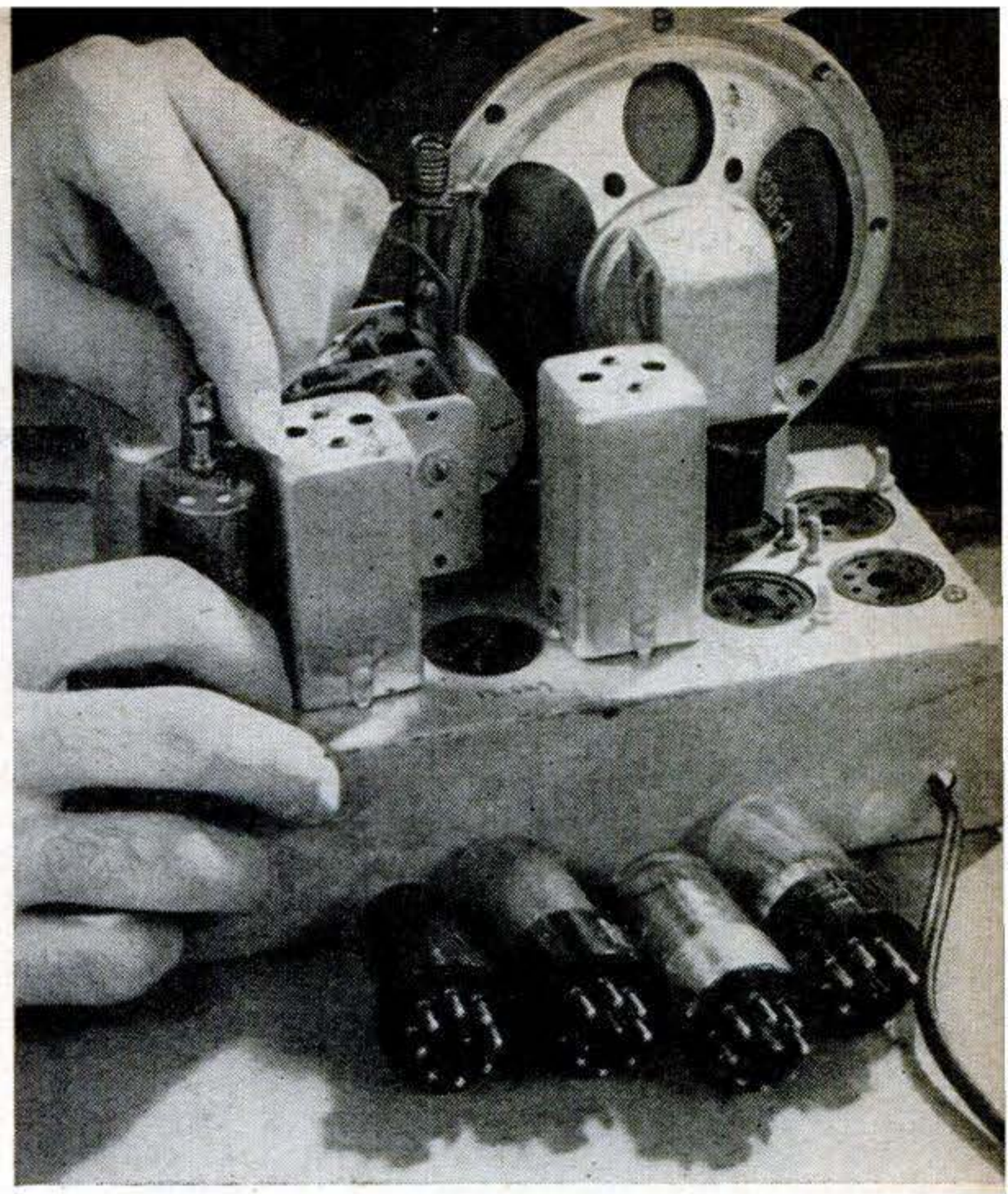
Pins 2 and 7 are the filament connections These are shown separately in the schematic diagram. Solder a piece of yellow wire to one of these—say pin 2—but don't make any connection to the other one. If you follow the same system with the remaining tubes you will simply connect the yellow lead from pin 2 of the 12SK7 to pin 7 of the 12A8 after all sockets are in place.

The oscillator coil (L2) is a rather small unit with four lugs. Solder the plate lug (usually indicated by a blue dot) directly to prong 6.

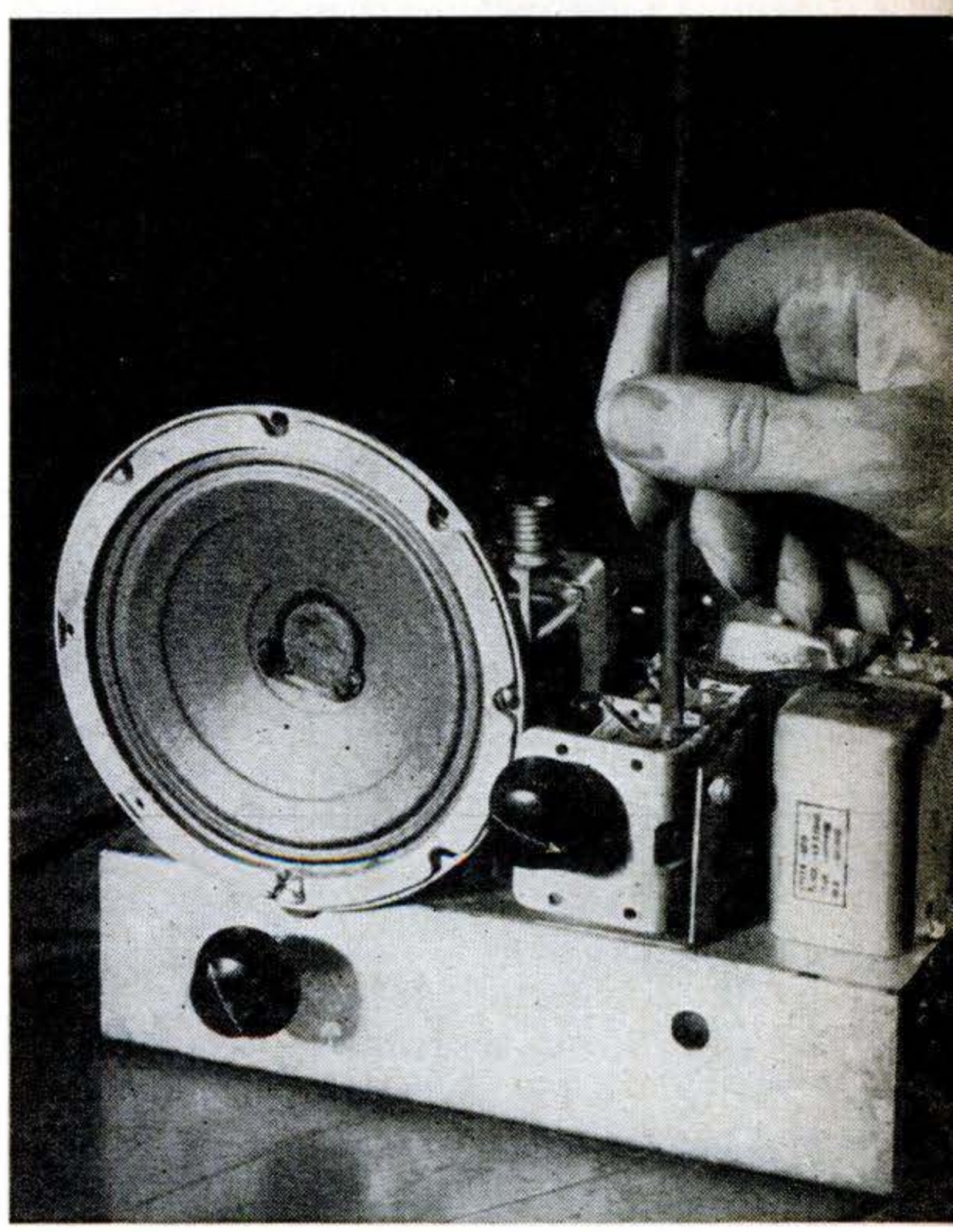
The critical 50,000-ohm resistor, R1, is connected across pins 5 and 8. Try to get a very small resistor that will fit neatly between these pins and be entirely out of the way. Hook it in place, but don't flow in the solder until you have made the remaining connections to these pins. You can usually get a better joint when you avoid cluttering it up with too much solder. In the case of prong 8 the additional connection is only a ground lead; pin 5 isn't finished until you have brought to it one end of R2 (a 15-meg. resistor) and of C3 (a .0001-mfd. mica condenser). The other end of C3 can be soldered to the grid (green) lug of the oscillator coil at the same time. One end of a 20,000-ohm resistor (R3) goes to pin 4. Hold off the solder on this one, too, as another connection will be made later.

All these connections can be made before the 12A8 socket is attached to the chassis. After the socket is in you will be able to bring the plate (blue) lead of IF1 (the input IF transformer) to pin 3; the B-plus (red) wire from the same transformer to pin 4; and the lead from filament pin 2 of the 12SK7 to prong 7. The connection to the grid cap at the top of the tube consists of a short jumper from the RF section of the variable condenser, C2.

For all of the tubes except the 35Z5 rectifier, the filament connections may be reversed without causing any harm. But on



Tubes are fragile, so install them only after all the wiring is completed. The jumper lead from the RF section of C2 must be clipped to the grid cap of the 12A8 mixer tube.



An alignment tool should be used for adjusting trimmers. Being nonmetallic, it can't short B-plus to ground. It also keeps hand capacitance from changing any of the circuit constants.

Copyrighted material

the 35Z5 it makes a great deal of difference. If the line lead is brought to pin 7 instead of pin 2, the No. 47 pilot light will burn out. There will also be a voltage drop of about 35 volts due to the resistance of the filament. This will be reflected in decreased B-plus and plate voltages in other parts of the circuit. Make absolutely certain, therefore, that the live line lead comes to prong 2 of the rectifier.

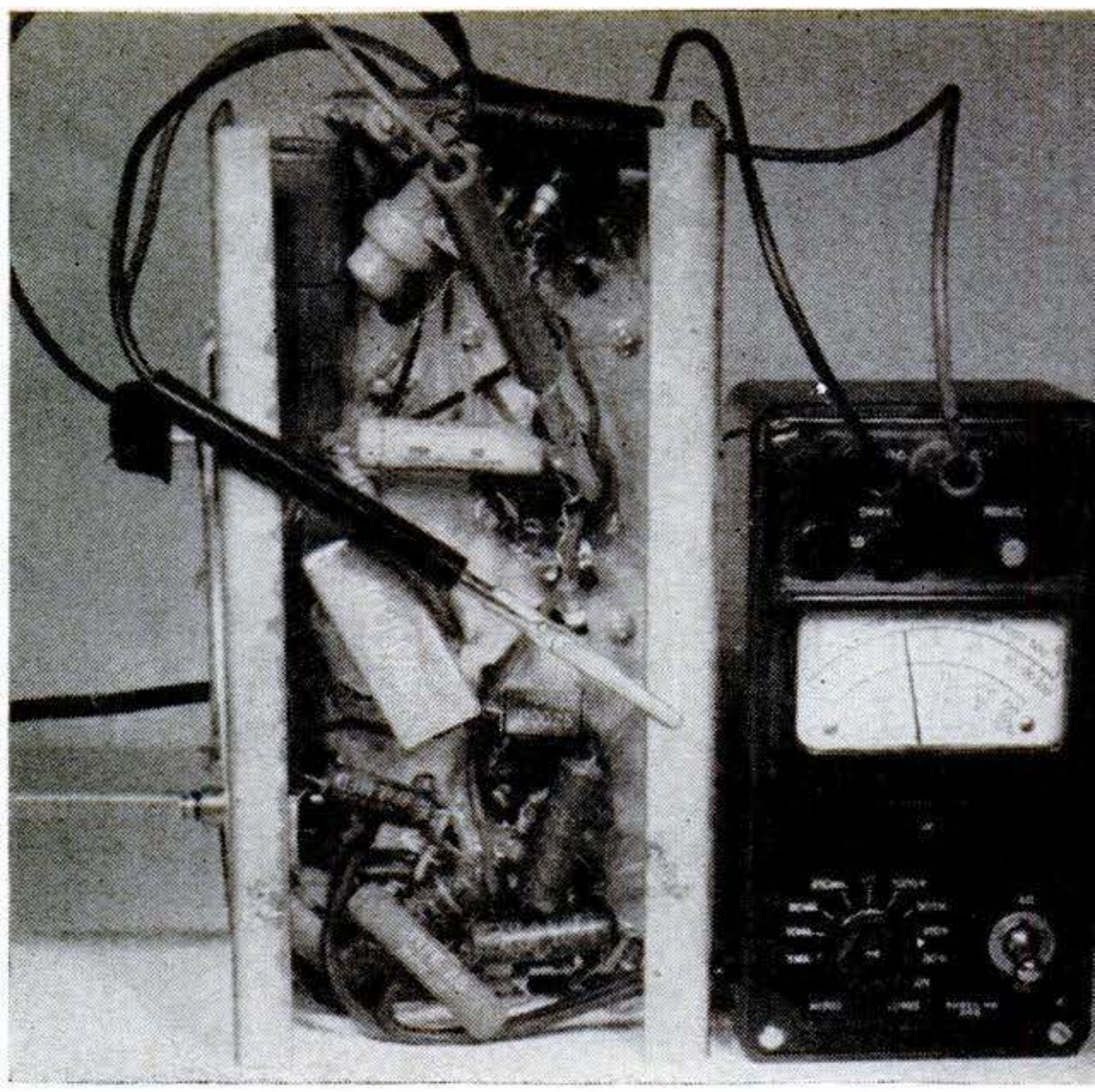
With pin 8 of the 12SQ7 and one leg of the switch grounded, the filament circuit is complete. A break anywhere in this line will kill the operation of the set completely. That's the reason servicemen always suspect a tube-filament burnout first whenever an AC-DC set fails to light up.

Using the chassis as the power-line ground connection has some desirable shielding effect, but it is important to note that it also produces a "hot" chassis. *Never* let the chassis come in contact with a radiator, water pipe, or any other metal that leads to an earth ground, and don't touch it yourself when the line plug is connected. Felt or rubber-covered bumper feet in the bottom of the cabinet, and plastic or similar insulating knobs on the volume-control and tuning-condenser shafts are desirable. The .00025-mfd. mica condenser, C1, is inserted in the circuit principally to guard against accidental shorts through the antenna. A built-in loop could be used instead of the antenna coil, L1. In this case, simply omit C1 and L1 and wire in the loop in place of the antenna-coil secondary—i.e., between the points marked "C-" and "Grid." All grounds shown in the diagram are to the chassis itself. Never use an external ground.

For systematic service checking—and even for effective building—one of the most useful instruments you can have is a multitester or AC-DC volt-ohm-milliammeter. This will measure the ohmic value of most of the resistors and coils (depending on the meter's range) and will enable you to check voltages at any point in the set.

If you have the use of a meter, it is a good idea to take as many readings as possible on the individual parts before you actually wire them into the circuit. This can frequently give you a clue to trouble in a completed set.

In taking voltage readings it is considered good practice to clip the negative voltmeter terminal to the chassis or ground, then touch the positive lead to the various tube pins. Voltages exist at many other points, but



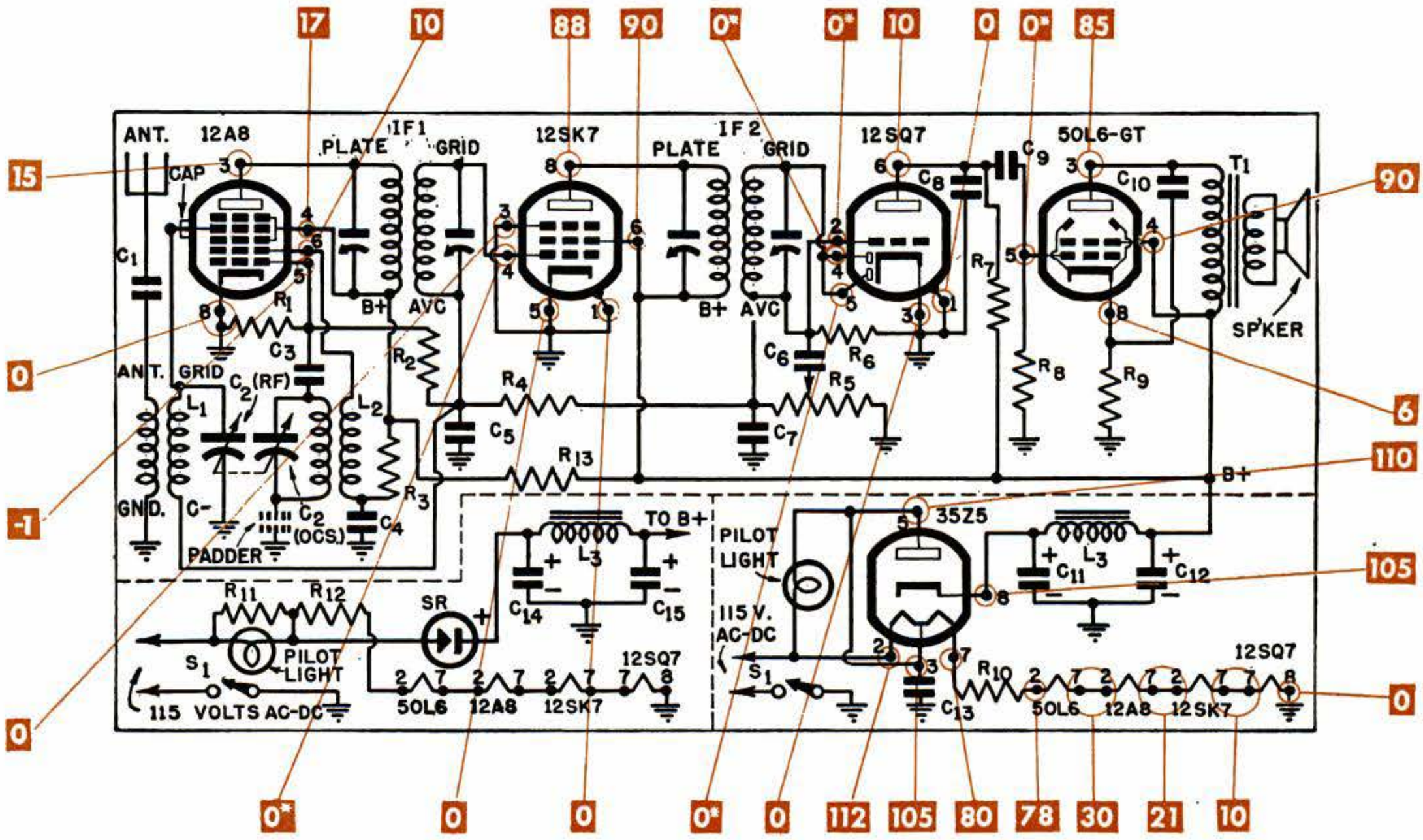
Clip the negative prod of a voltmeter to the chassis; touch each tube pin with the other.

what you can't read directly by this method you can usually get by subtraction. For example, if you subtract the voltage at pin 3 of the 12A8 from that at pin 4, you have the voltage drop across the primary of IF1.

As an aid to ready checking, a table of voltage readings is given on page 223. These were taken with a 1,000-ohm-per-volt meter. An instrument of greater or lesser sensitivity will give different readings in many cases because of the "loading" effect of a meter on a circuit. Greatest accuracy is obtained with a vacuum-tube voltmeter because of its high internal resistance. If you have one of these instruments you will probably be able to observe a slight negative voltage at the points marked in the table 0.* On the low-resistance meters used in these tests, no needle deflection was noted. Values shown in brown on the table represent filament voltages; when the set is used on AC, these will have to be read on the AC meter scale. Above the table is a reprint of the schematic diagram with each voltage related to its proper pin.

Your readings may vary slightly, and if they do, don't worry about it. Remember that voltage checks are used primarily as guides to trouble *when trouble appears.* To scramble a metaphor, the proof of the pudding is in the listening. If the set sounds good, you can forget about almost everything else. If it doesn't, or if it fails to operate entirely, an incorrect voltage may give

Copyrighted material



Taking a reading from each of these points to ground will show whether voltages are present at the places where they should be and whether they are large enough to do their job properly.

you the clue you need to find the trouble.

The big bugaboo in superhets—and the thing that has made many experts feel that the circuit is too complicated for the beginner—is alignment. This consists of integrating the various circuits so that they are in harmony with each other. Fortunately it is rarely necessary to do the job entirely on your own. Manufacturers generally align their IF transformers pretty well at the factory. You only have to make small adjustments. Whatever you do, *don't tamper with the trimmers on these transformers until the set is finished.*

Automatic volume control—AVC—uses part of the rectified signal present at the detector to vary the grid bias on the 12SK7 and 12A8. When a strong signal comes through, the amount of voltage available for biasing goes up and this automatically decreases the amplification of the tube. On a weak signal the reverse occurs. Now, for aligning you want to know when you are getting a station at maximum strength, and this automatic compensation for weak signals would only throw you off. The first step, then, is to ground the AVC by running a jumper from the black lead of the input IF transformer to ground.

Set the manual volume control (R5) at maximum, and tune in the strongest local station. Working back from the output end, and using a fiber wand or other insulated screwdriver, adjust the trimmers for maximum output in the following order: the secondary of IF2, then the primary; the secondary of IF1, and again the primary. Now tune in a station somewhere around 1400 kc—the variable-condenser plates are almost fully open at this point—and adjust the oscillator section of the tuning condenser, and, last, the RF section of C2. Bear in mind that it is seldom necessary to make much of an adjustment in the IF trimmers. Don't touch them at all until you have tuned in a station.

Should the signal become quite loud during the adjustment, it is advisable to get a weaker station. When you have the high end of the band lined up, tune in a station at the other end and make whatever slight adjustments may still be necessary. END

TUBE	PRONG							
	1	2	3	4	5	6	7	8
12A8	0	30	15	17	-1	10	21	0
12SK7	0	21	0	0*	0	90	10	88
12SQ7	0	0*	0	0*	0*	10	10	0
50L6	NC	78	85	90	0*	NC	30	6
35Z5	NC	112	105	NC	110	NC	80	105

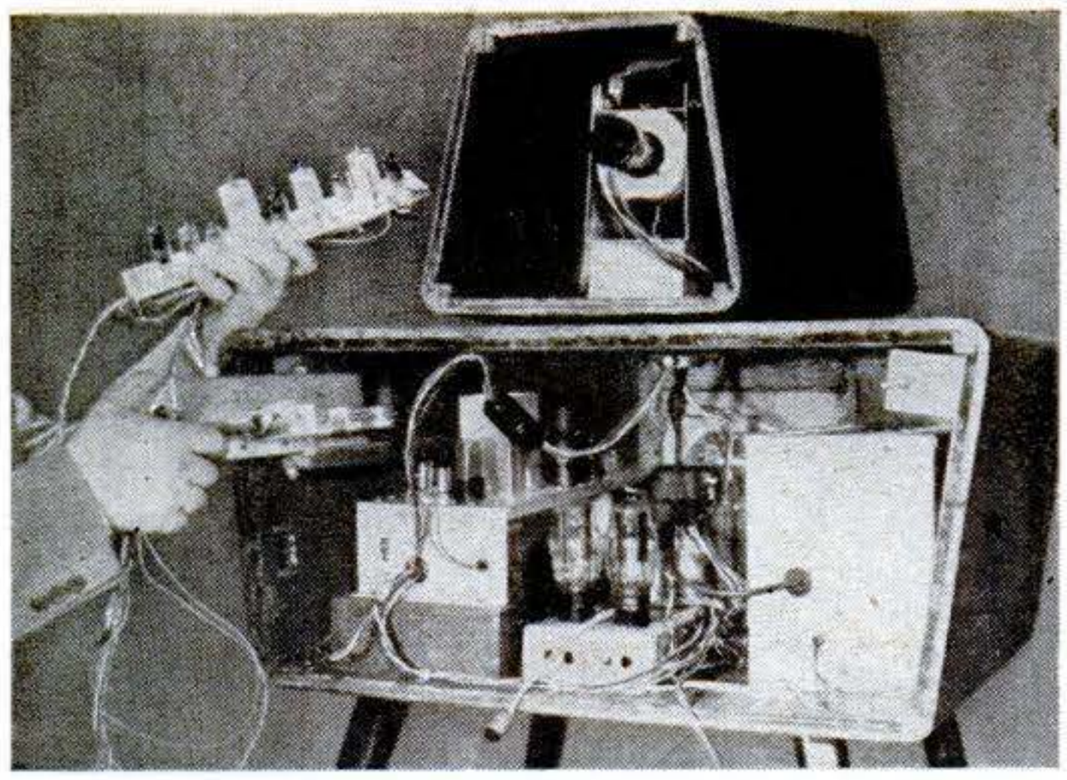
For a negative reading, polarity of the voltmeter terminals must be reversed. A vacuum-tube voltmeter should read slightly negative at the points marked with an asterisk (*).

Copyrighted material

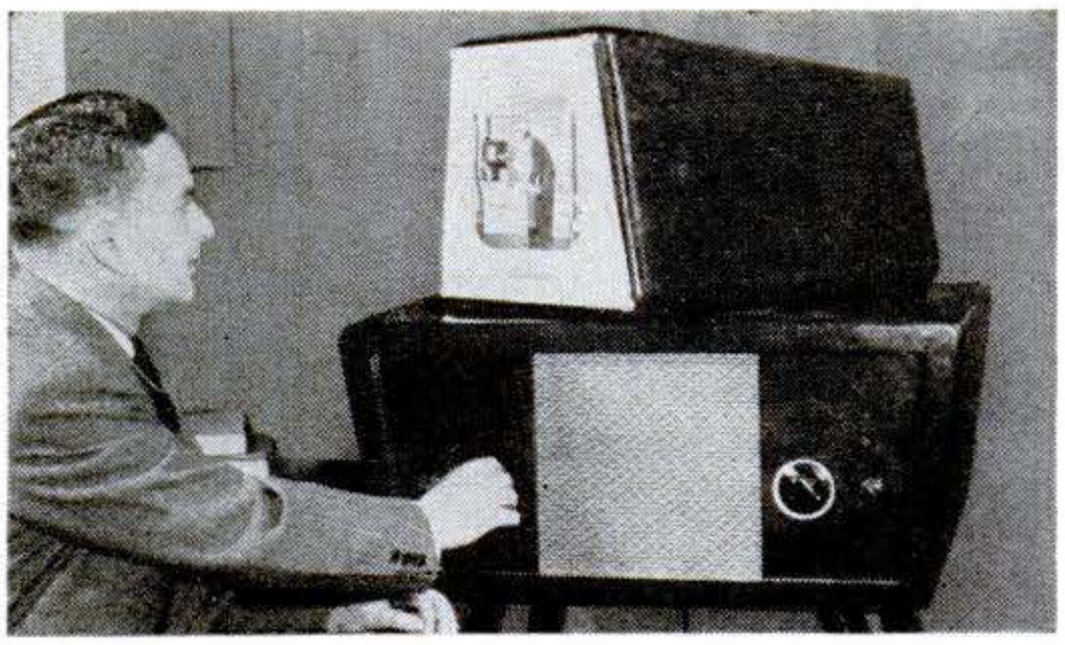
NEWS IN ELECTRONICS

Transmitter Has Two Ears. One of the major differences between live music and a radio reproduction of it is that radio has only one ear. Binaural (two-ear) hearing is what enables you to distinguish the direction from which sound comes. Experiments in "stereophonic" or two-transmitter broadcasting, recently conducted in Holland, are said to offer promise of greater realism in radio reproduction.

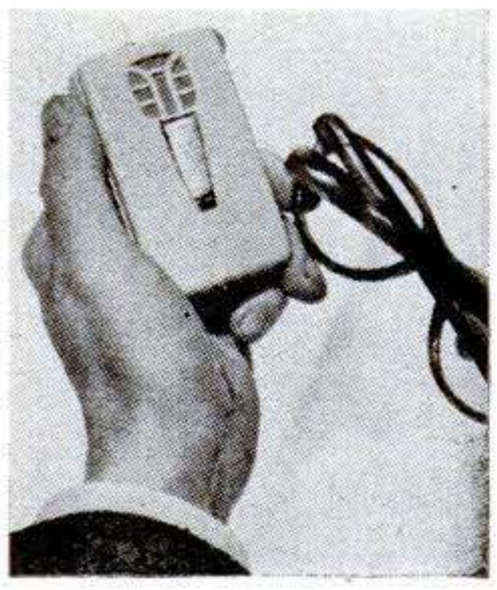
Comparable to stereoscopic or three-dimensional photography, this system uses two microphones to feed separate transmitters operating on different frequencies. Two receivers reproduce the broadcasts in the same relation as heard by the two "ears" in the concert hall.

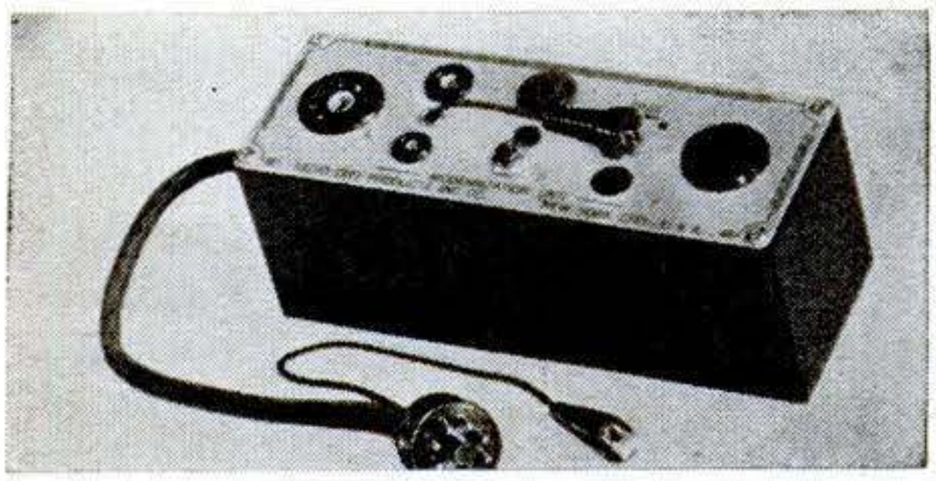


Chassis Plugs In. Fragile and bulky television receivers can't easily be carried to a service shop, so some manufacturers are building sets on multiple chassis. The model shown here has five. One or more of them can be quickly replaced by the serviceman. Defective units are repaired in the shop. Cleervue Television Corp., Brooklyn, N. Y., is the maker. The picture tube, housed separately, can be swiveled 180-deg. for easy looking.



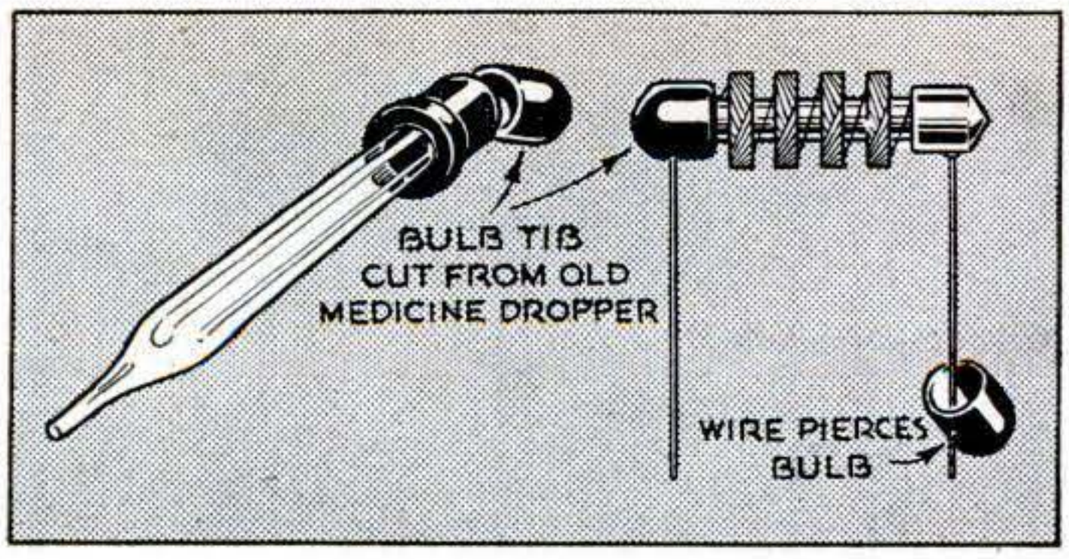
Printed circuits combining 45 parts on one chassis are said to make the new Beltone Mono-Pac Ⓣ the smallest hearing aid to date. The tiny electronic unit weighs less than 6 oz. and measures 2 3/16" by 3⅝".





Unit Modernizes Tube Testers. The appearance of many new tube types—especially postwar miniatures—threatens thousands of old tube checkers with obsolesence. To meet the problem, Radio City Products Company, Inc., New York, has introduced two units that can be plugged into a socket on the old tester. New tubes are tested in the adapter.

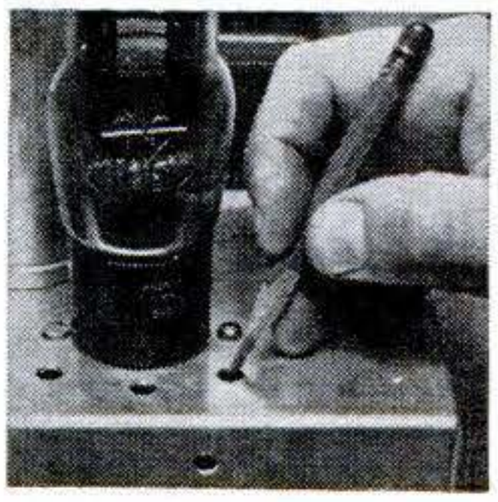
Copyrighted material



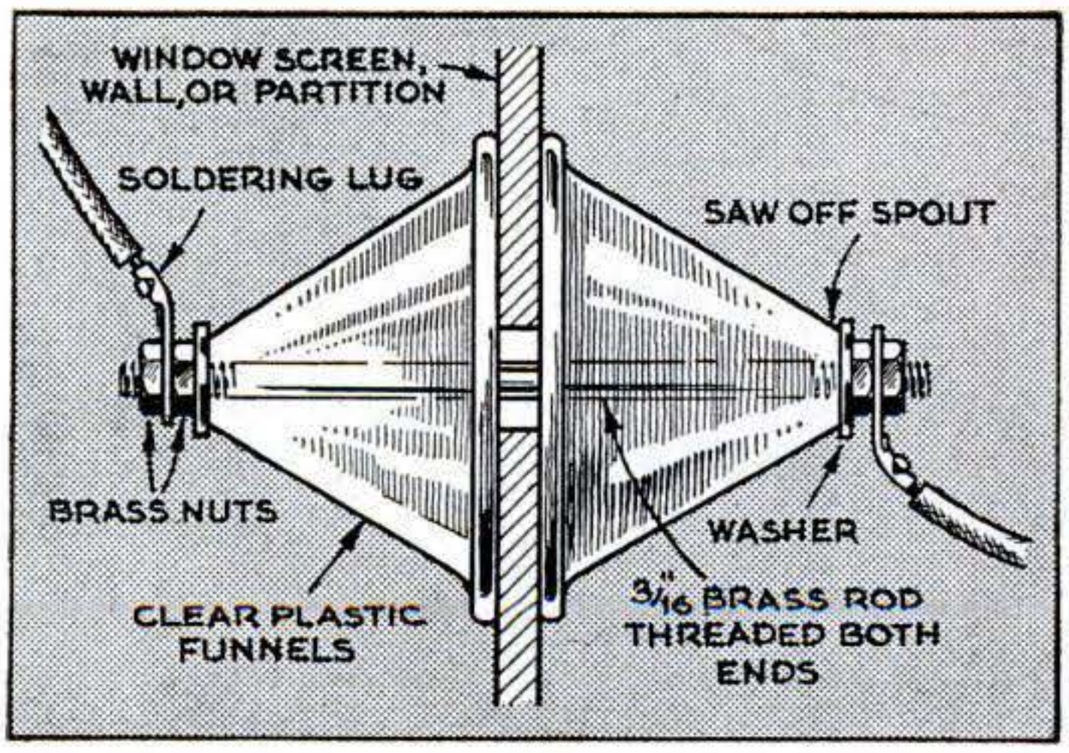
Rubber Tips Insulate Chokes

WHEN crowding radio parts close together to make a compact job, here's a method for protecting the bare metal ends of an RF choke against accidental contacts. For each end, cut the rubber tip from an old medicine dropper and place it over the end as shown.—*Alfred H. Fortier, Orono, Me.*

Vent Holes Prolong Tube Life

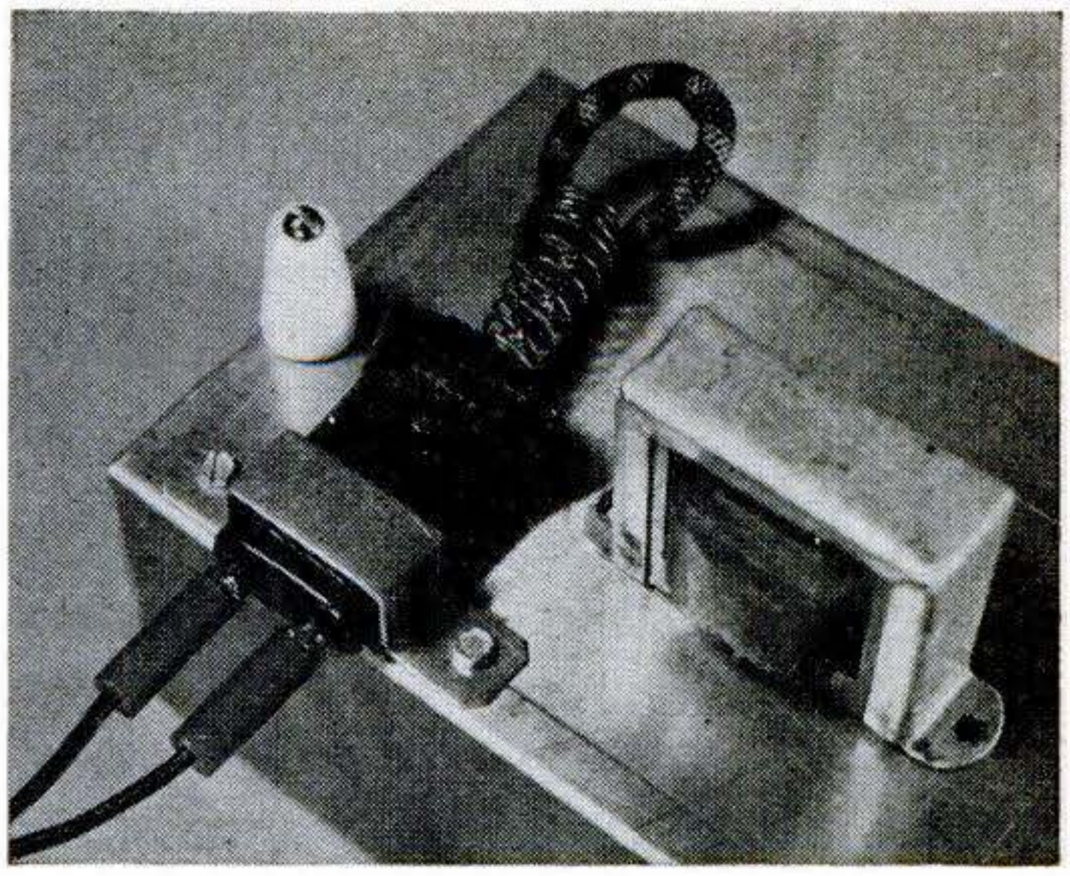


A FEW ¼" holes drilled around the socket of the rectifier tube of a large receiver, amplifier, or transmitter will keep the tube cooler and thus help to increase its life. Other nearby components are also benefited because the increased air circulation carries away much of the damaging heat.—*D. J. Bachner, Jackson Heights, N. Y.*



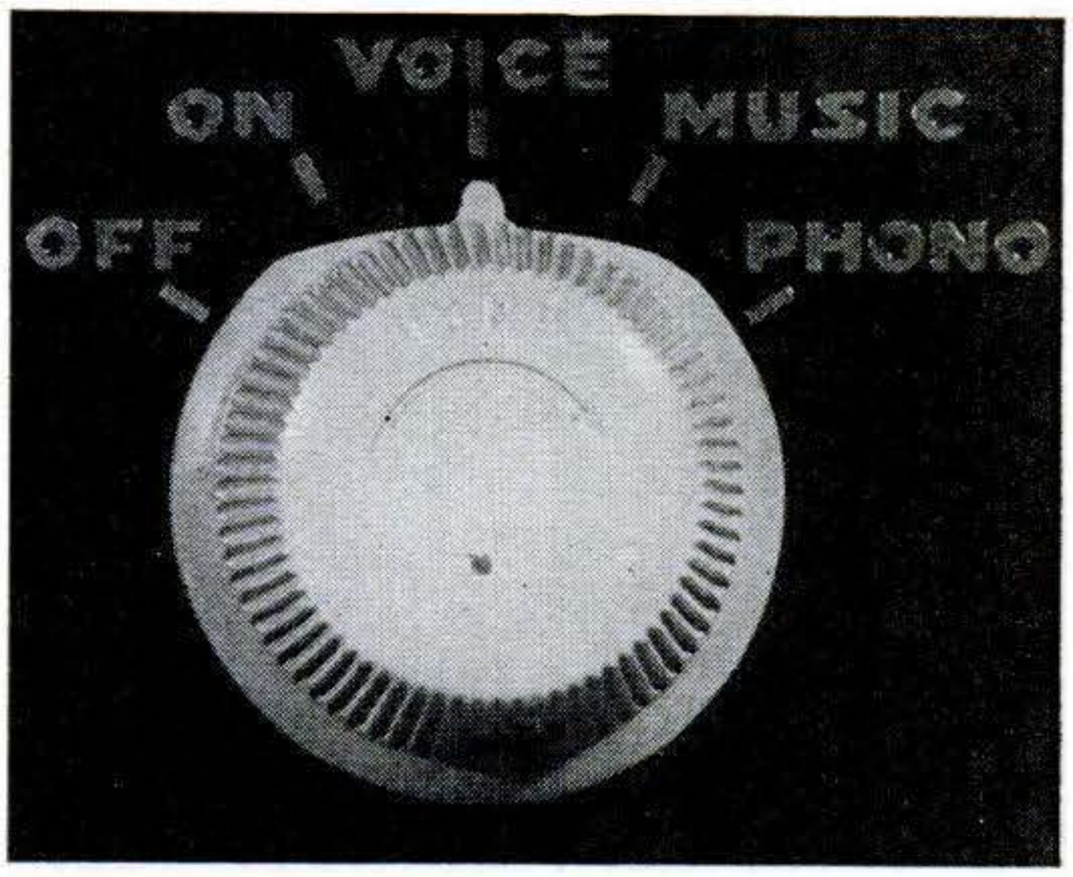
Insulators Made From Funnels

I MADE some swell cone-type feed-through insulators from the small plastic funnels sold in dime stores. Comparable commercial insulators would have cost me a lot more. Two of the funnels, with the tips cut off, are used for each insulator as shown in the sketch above.—*Arthur Trauffer, Council Bluffs, Iowa.*



Iron Plug Is Phone Terminal

AN OLD electric-iron plug can be converted into a handy terminal for a mike or phono input or used for an output connection to speaker or phones. Its own cable can be brought under the chassis to the appropriate connections. Incoming leads are fitted with banana plugs, which are in most cases a good fit in the holes. Either bolts and nuts or self-tapping screws can be used to hold the clamp. Being built with heavy-duty insulation, the plugs can be attached directly to the chassis as shown.

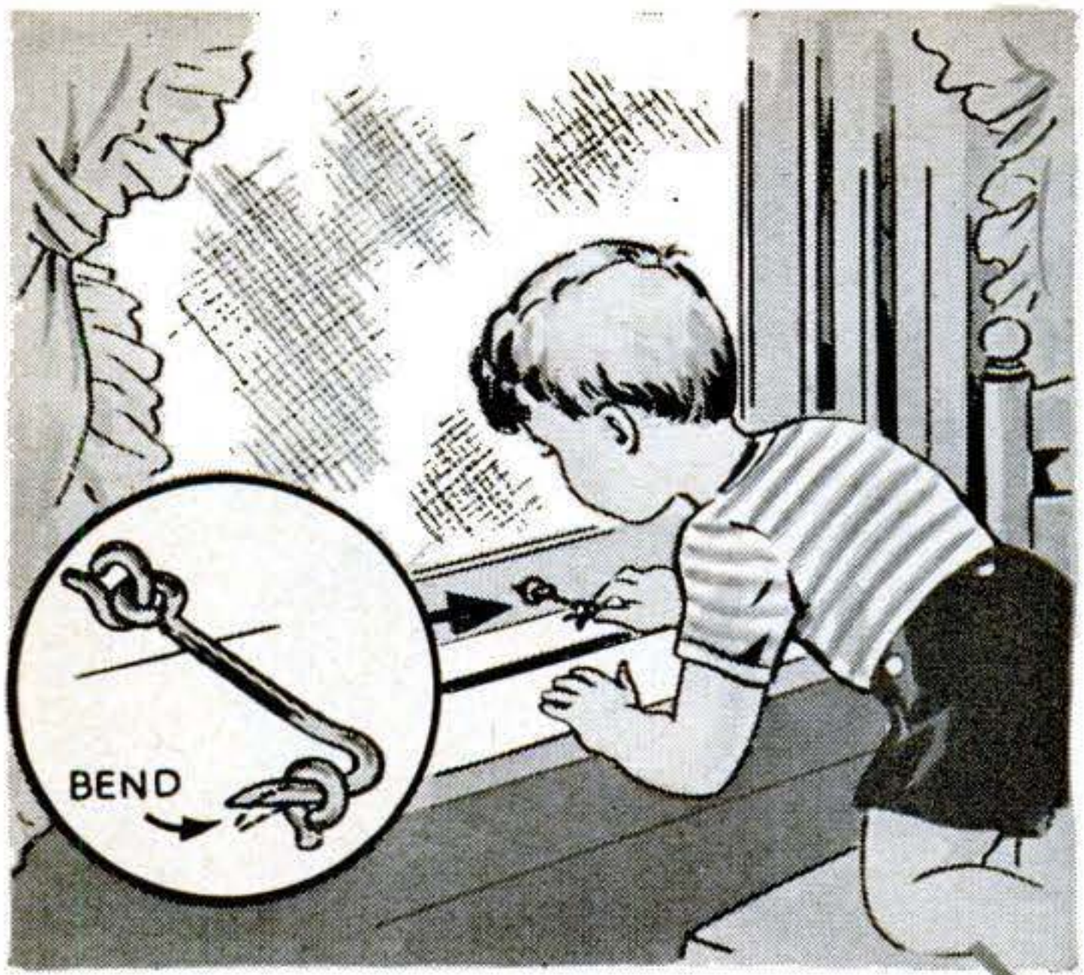


Pointer Filed on Plain Knob

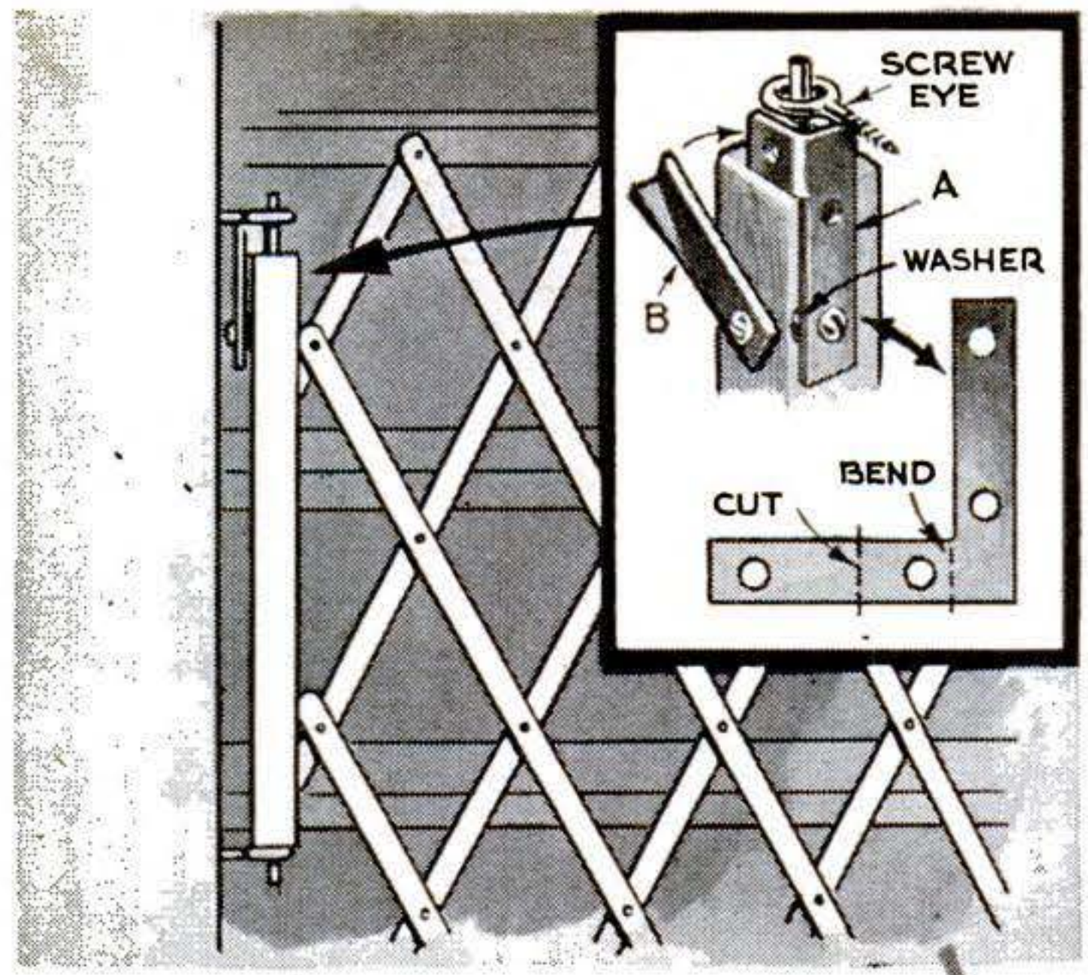
IT IS often convenient to have a reference point on the knob of a volume, tone, or other control so that a setting can be noted for future use. If you don't have a pointer knob on hand or want one that matches the others as closely as possible, you can convert an ordinary round knob to your purposes as shown. File two small flats on the rim, leaving a small portion between them. Then file this portion sharp to form the pointer.

A spot of paint or nail polish on the point will make it easier to read.

Copyrighted material



Screens and storm windows seem to invite tampering. Bend the hook as shown so it will resist his fingers but not yours.

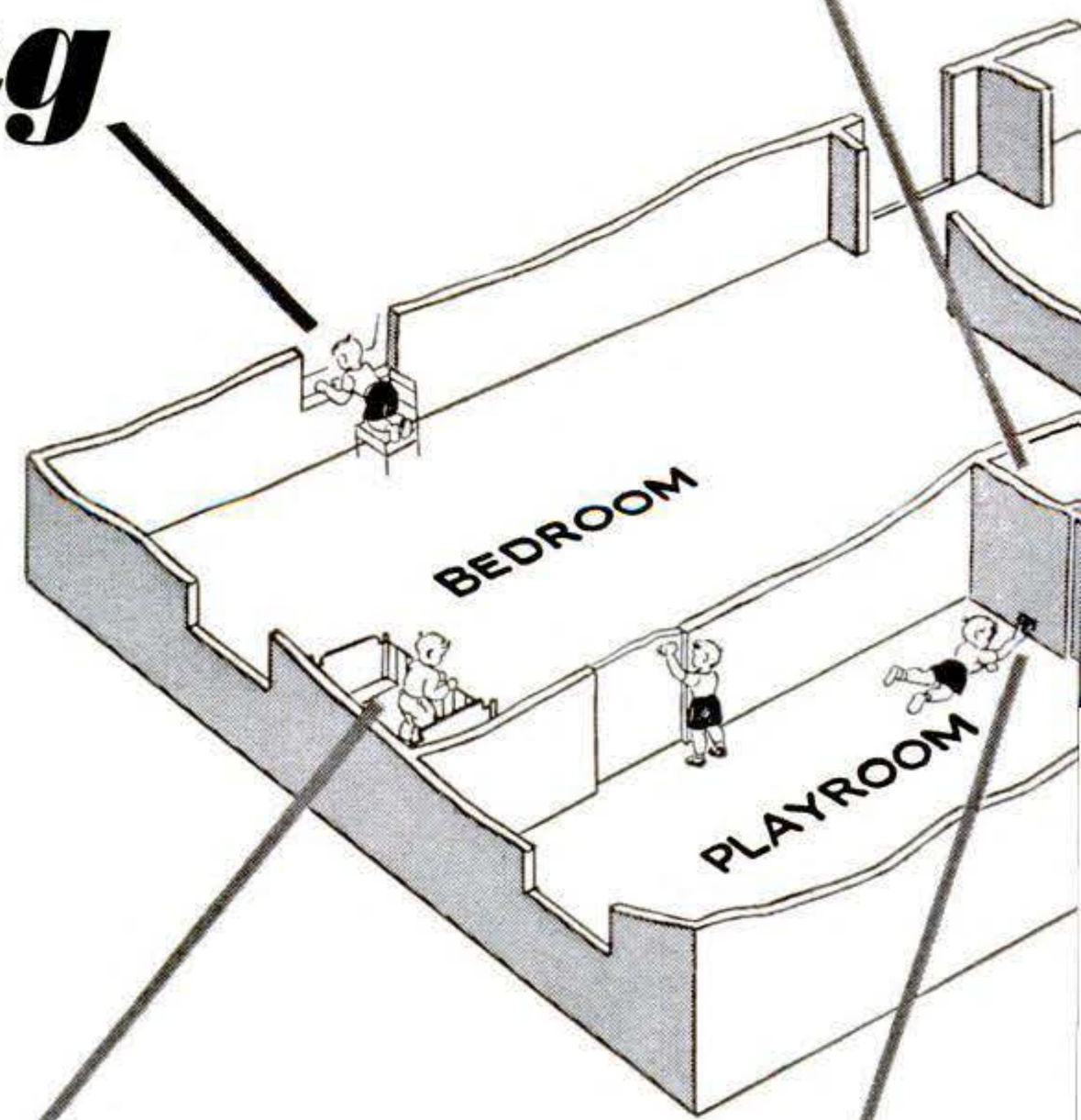


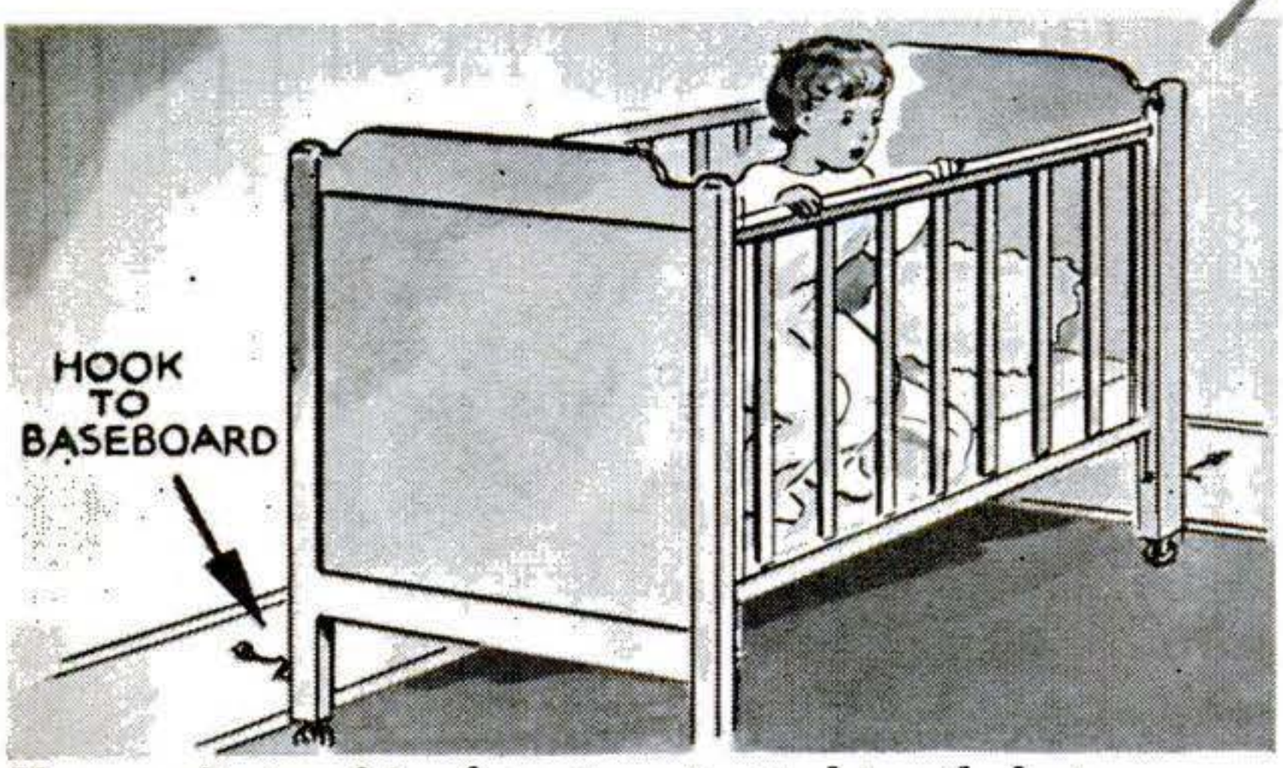
Headless screws enter screw eyes, the top one first, to lock this stair gate. Lever A is swung up, then B secures it.

Babyproofing Your Home

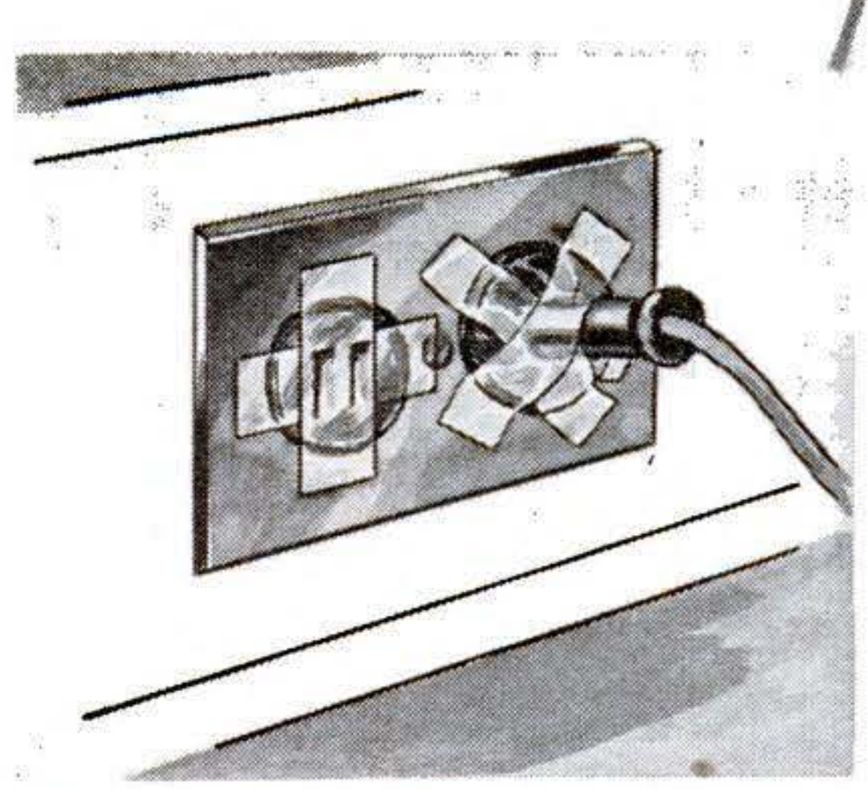
"SAFE at home" may mean something in baseball, but anybody who thinks it applies to houses just hasn't lived with kids. You can trust any youngster to find a dozen danger spots in his own bedroom without half trying. If he's not probing electric outlets with a hairpin, he's probably planning the easiest way to fall out a window.

The only answer is vigilance plus an ounce or two of forehanded prevention. There's just no substitute for the first, but these simple ideas for countering some common hazards may stave off those gray hairs a while.



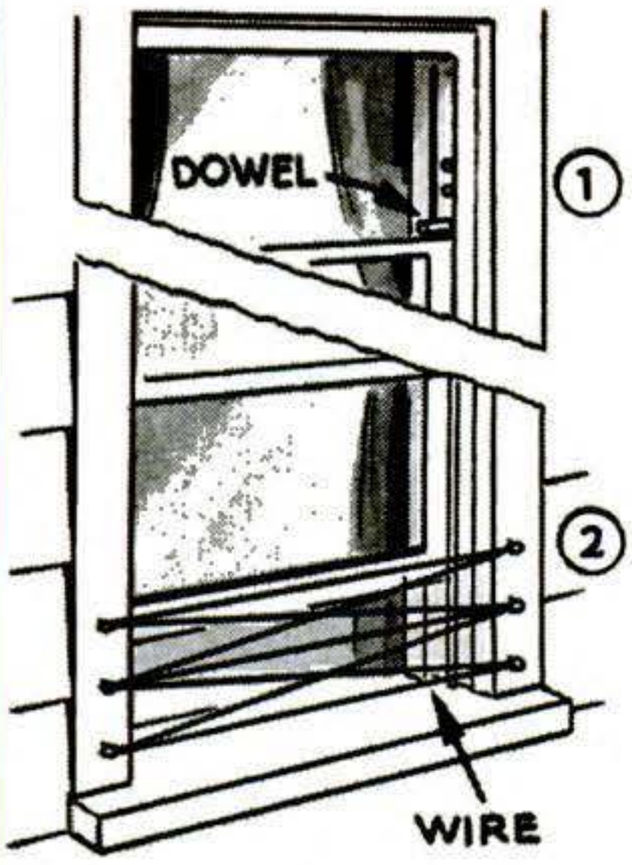


You can't stop him from jumping in his crib, but you can fix the crib so it won't block doors or tumble furniture.

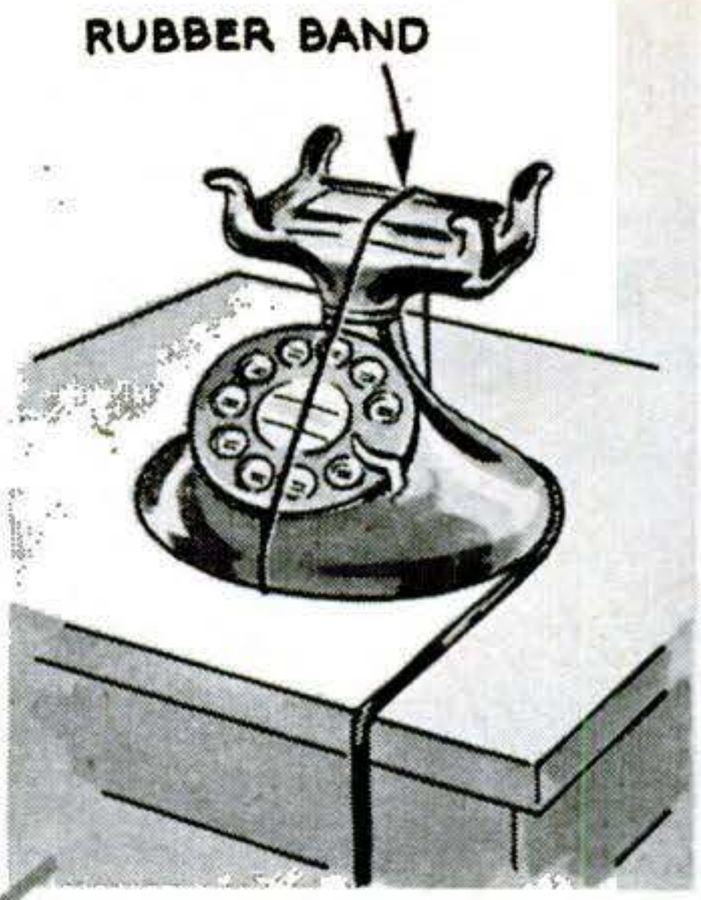


Wall outlets are less dangerous when they're protected with cellulose tape.

Copyrighted material

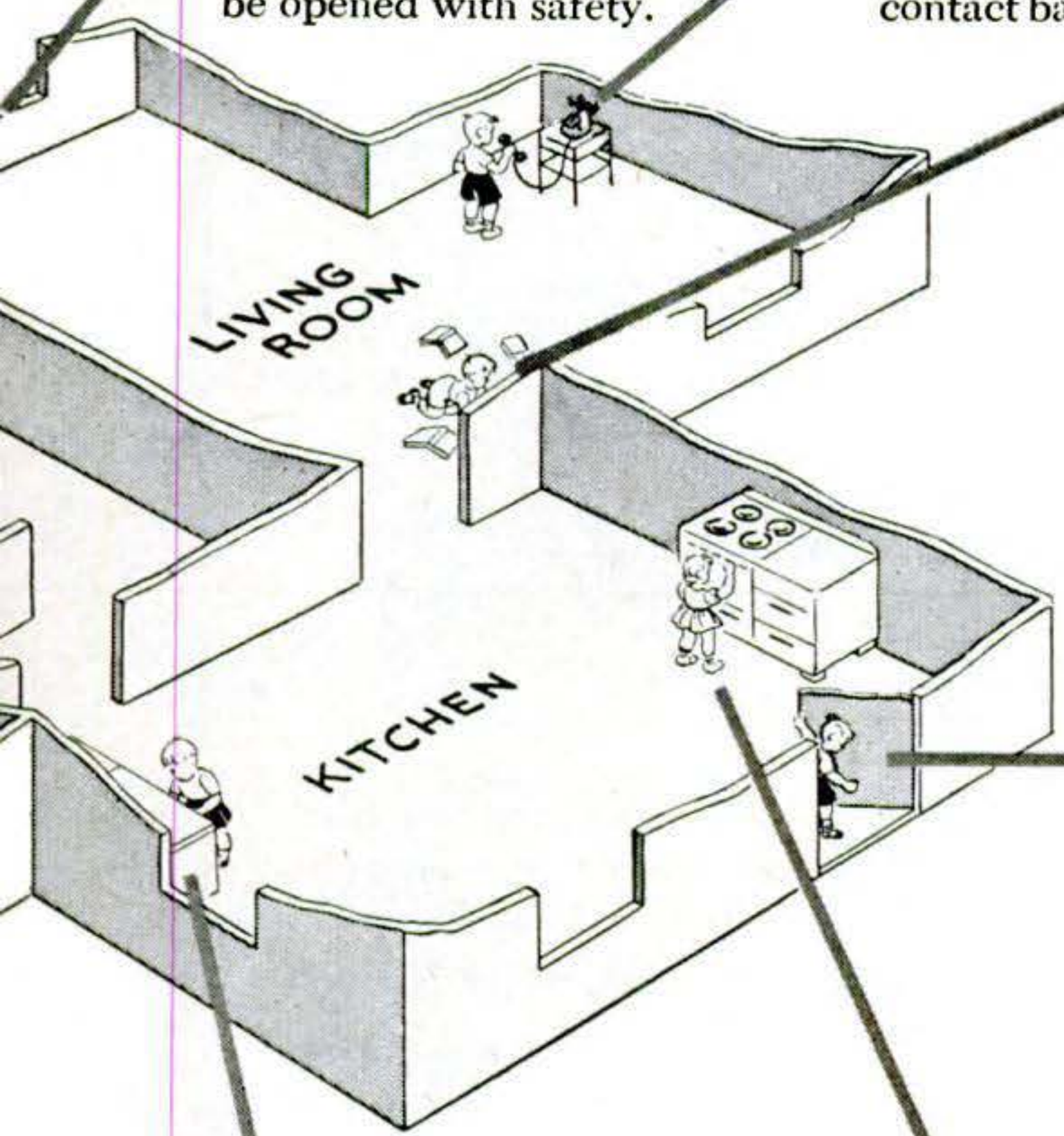


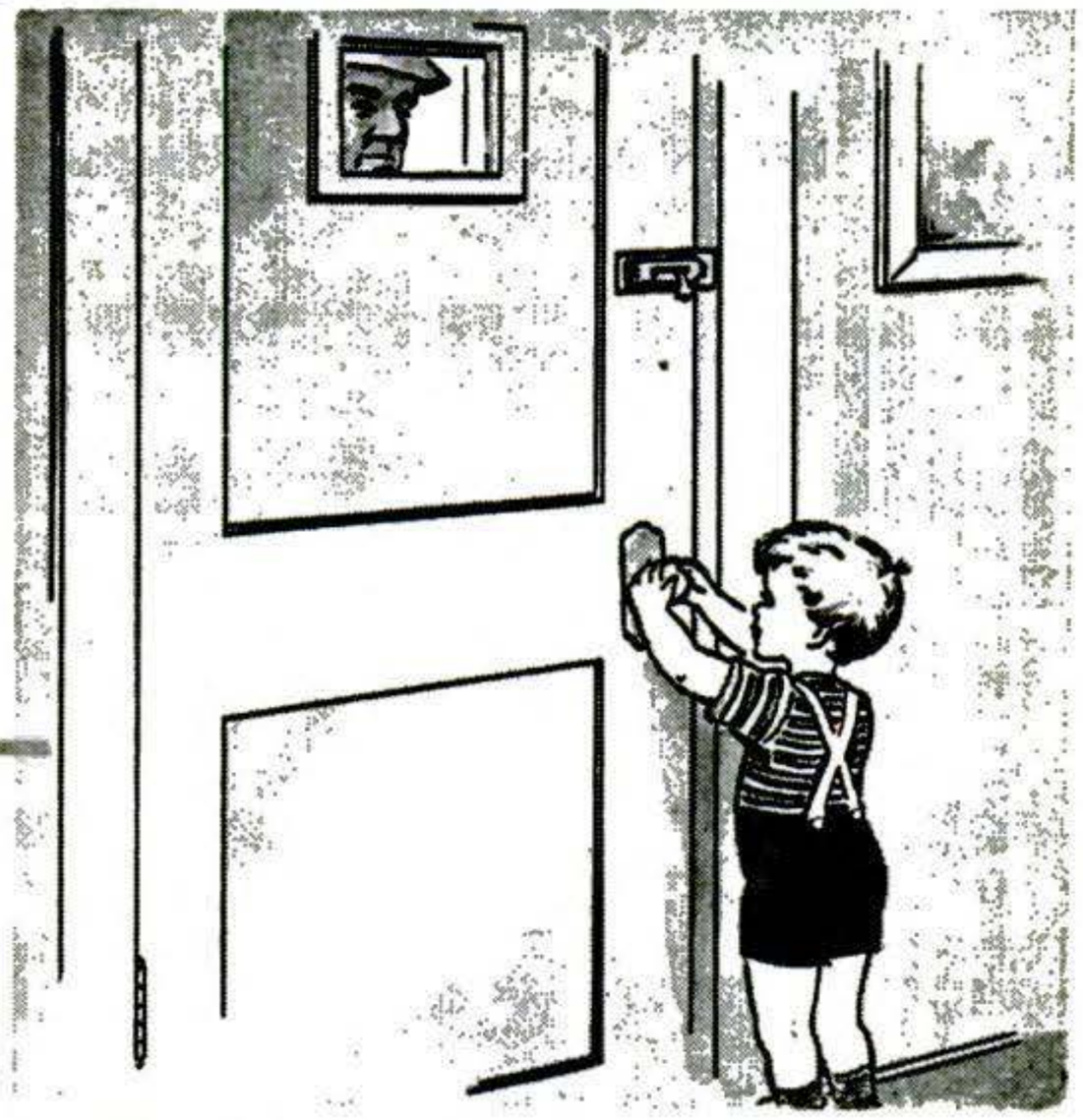
Dowel stops or looped wire allow windows to be opened with safety.



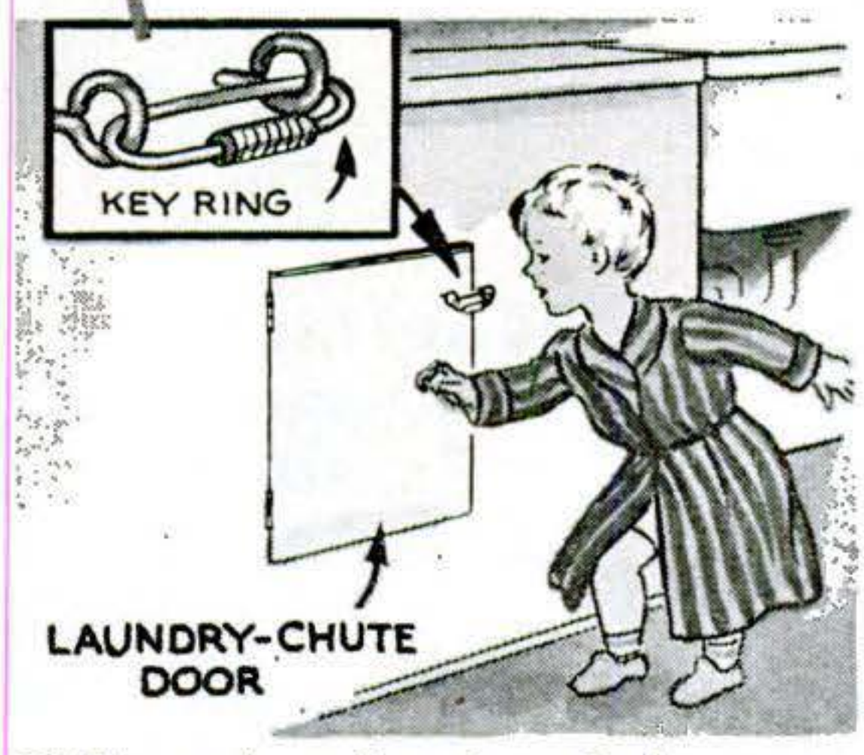
Receiver off the hook? A rubber band will keep the contact bar down anyway.

Books are fun to pull out. Wedge them in low shelves to thwart little bookworms.

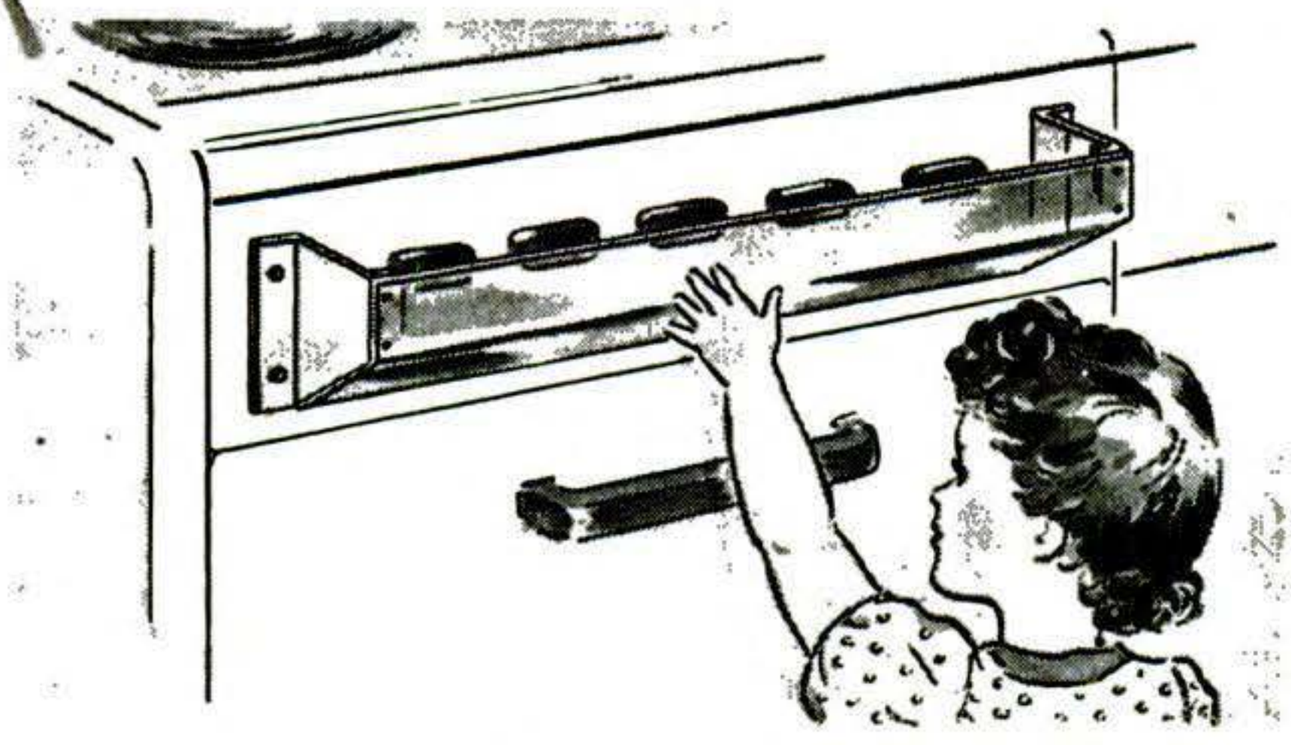




A draw bolt placed out of his reach will keep him from opening doors while you're upstairs.



Riding a laundry chute is dangerous fun. This latch will stump a child.

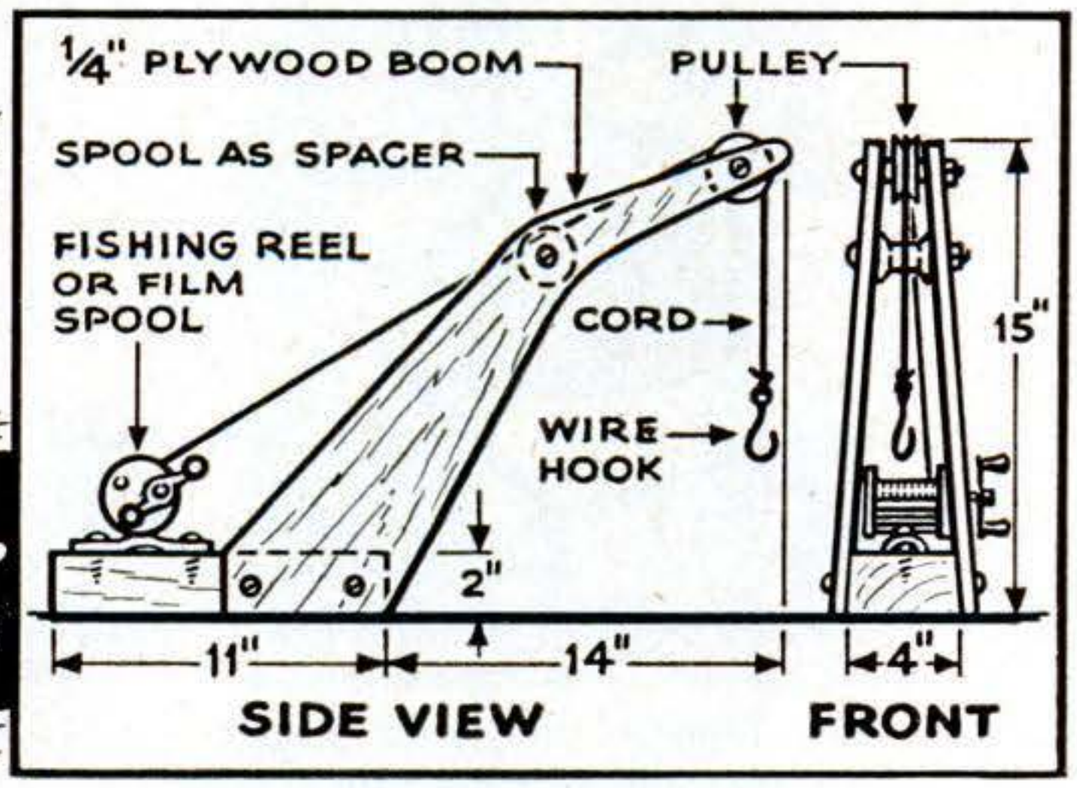


A trough bolted to the gas stove as shown will put the valves out of reach, though grown-ups can still use them.

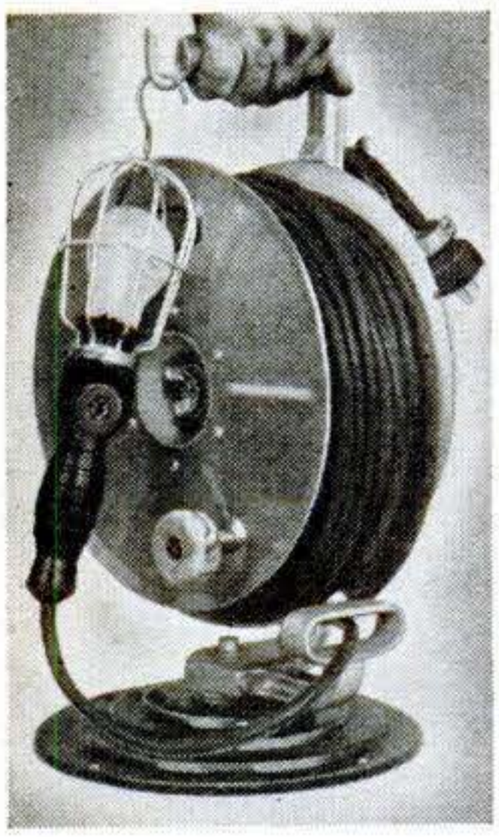
Copyrighted material

Homemade Crane Uses Old Fishing Reel as Winch

LOADING and unloading toy trucks and trains has endless fascination for children. This simple crane makes it even more fun. Bevel two edges of a wooden block (a piece of two-by-four will do) and fasten to it two plywood pieces for the boom. Mount a small pulley at the top, a thread spool at the bend, and an old fishing reel or a film spool on the base. Bearings for a film spool can be pieces of plywood mounted behind the boom. Use a tight-fitting dowel for a shaft and a bent nail as a handle.—*Carl V. Hanson, Renton, Wash.*



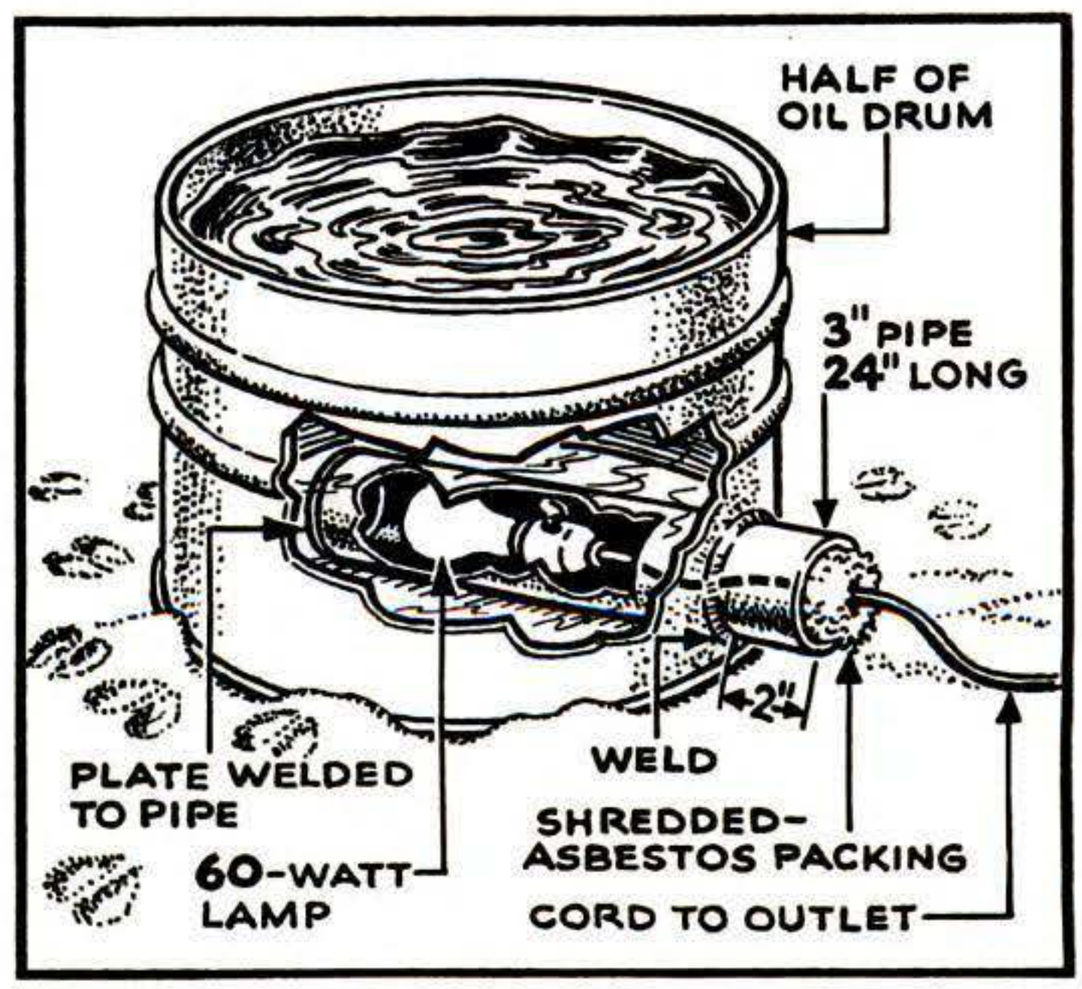
Portable Reel Holds Extension



WEIGHING only 15 lb., a portable reel makes up to 400′ of extension cord available for use by simply plugging in the device and pulling the wire. Current is fed to the revolving reel through collector rings. An adjustable brake controls rotation of the reel, which pivots on a ball-bearing swivel so the cord pulls off in a direct line from any direction. Industrial Electrical Works, Omaha, Neb., are the makers of the device.

Countersink Deburrs Holes

HOLES drilled in sheet metal are apt to have an annoying burr underneath. This can be quickly removed with a common countersink, used in a power or hand drill.

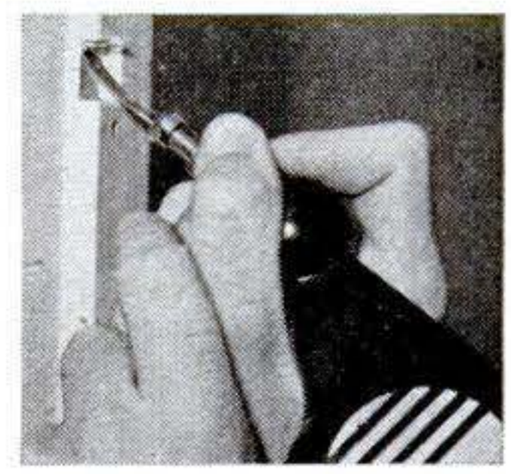


Bulb Heats Hog Water Tank

WITH a tough winter over, I've found this hog-water heater so useful it's worth remembering for the next cold season. It consists of a length of 3″ pipe welded shut at one end, fitted with a 60-watt bulb, and packed with asbestos. It's well to protect the lamp cord with boards or otherwise.—*E. L. Sadowski, Ashland, Ohio.*

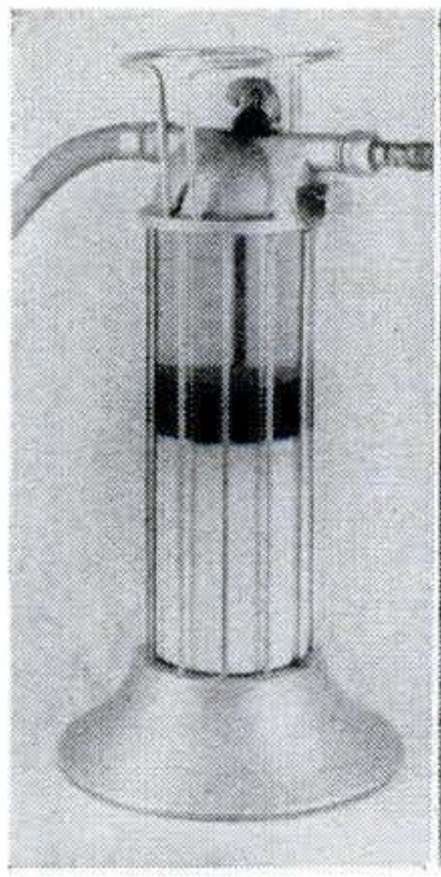
Electric Engraving Tool Cuts Small Mortises

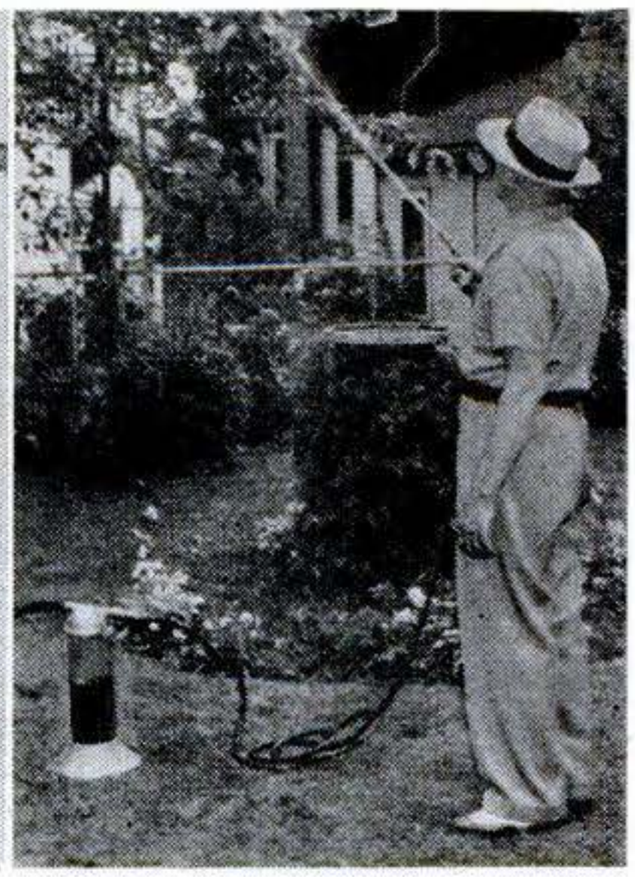
IF YOU don't know your own strength with a chisel, try an electric engraving tool next time you cut a mortise for a strike or a gain for a hinge. The vibrating blade supplies all the muscle, yet can be controlled to a hair. Mark around the hinge, or mount the strike temporarily to mark the area to be mortised. Using a straight wood-carving blade in the tool, make top and bottom cuts across the grain a little at a time. Remove stock with the grain to the depth of the cross cut, and repeat until the desired depth is reached.



Copyrighted material

New Lawn Aids Lighten Your Work



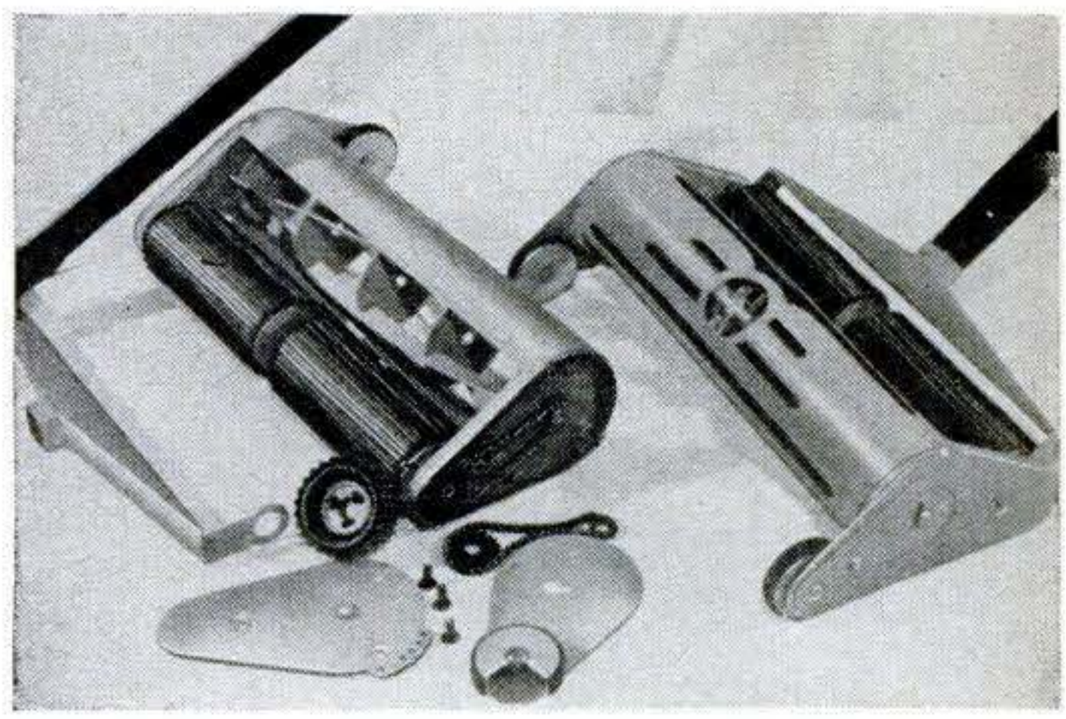


HERE are three products designed to help you keep your lawn in good order this spring and summer—an insect sprayer that you attach to a water hose, a lawn sweeper, and a mower that works on a new principle.

Upended for filling with insecticide, the sprayer is then placed on its base as above, the hose attached, and the water turned on. Water pressure against a free-floating piston inside the cylinder forces insecticide up a center tube into the outlet line. There it mixes with part of the water, one valve regulating the water flow and another the insecticide. Adjustment of the valves will produce a solution of any desired strength. Ottoson Product Co., New York, makes it.

Rotating brushes in the lawn sweeper (right above) pick up leaves, freshly cut grass, or other debris as it is pushed along. The sweeper is made by Parker Pattern and Foundry Company, of Springfield, Ohio.

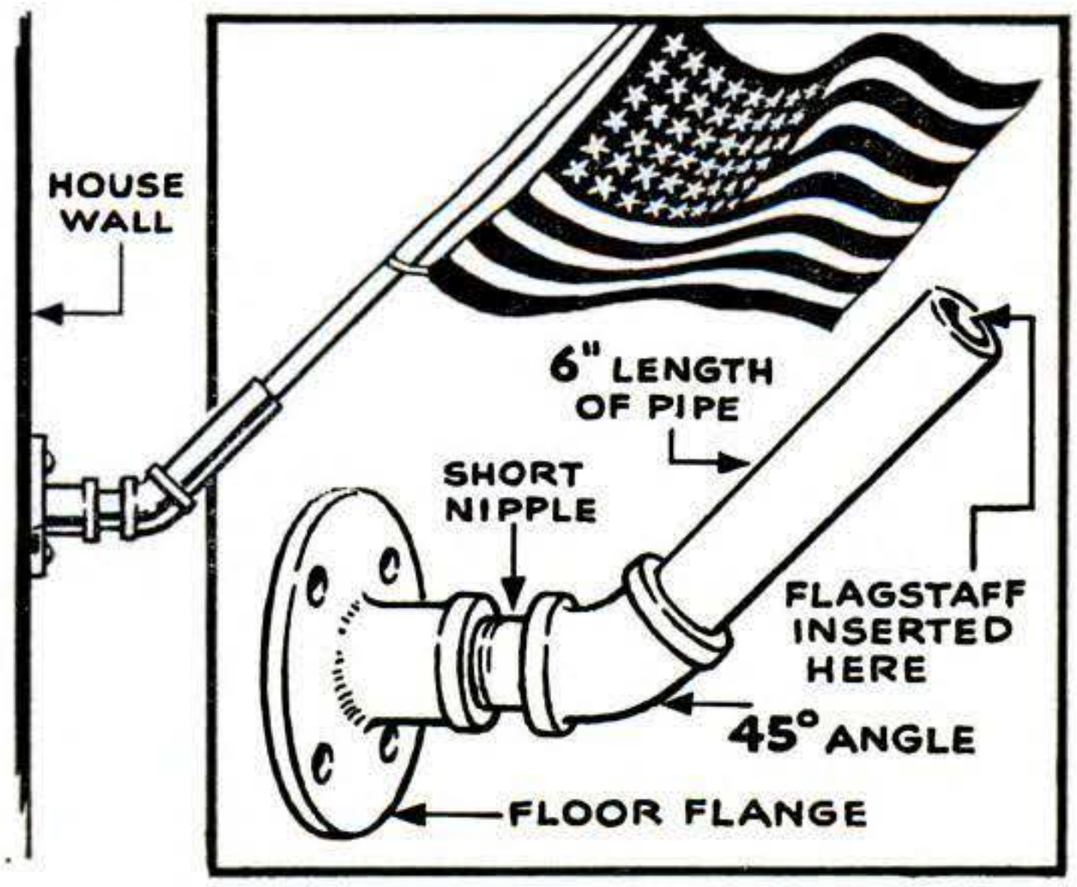
Weighing less than 20 lb., the lawn mower is chain-driven by two rubber-treaded rollers at the rear. Since these cover a broad area, the cutting reel does not dig into the sod when you mow around flower beds. The cutting width is 17″ and the cut height adjusts from ½″ to 2″. Shown below in both assembled and disassembled form, the mower, made by J. M. Dalglish Co., St. Paul, Minn., sells for about $15.



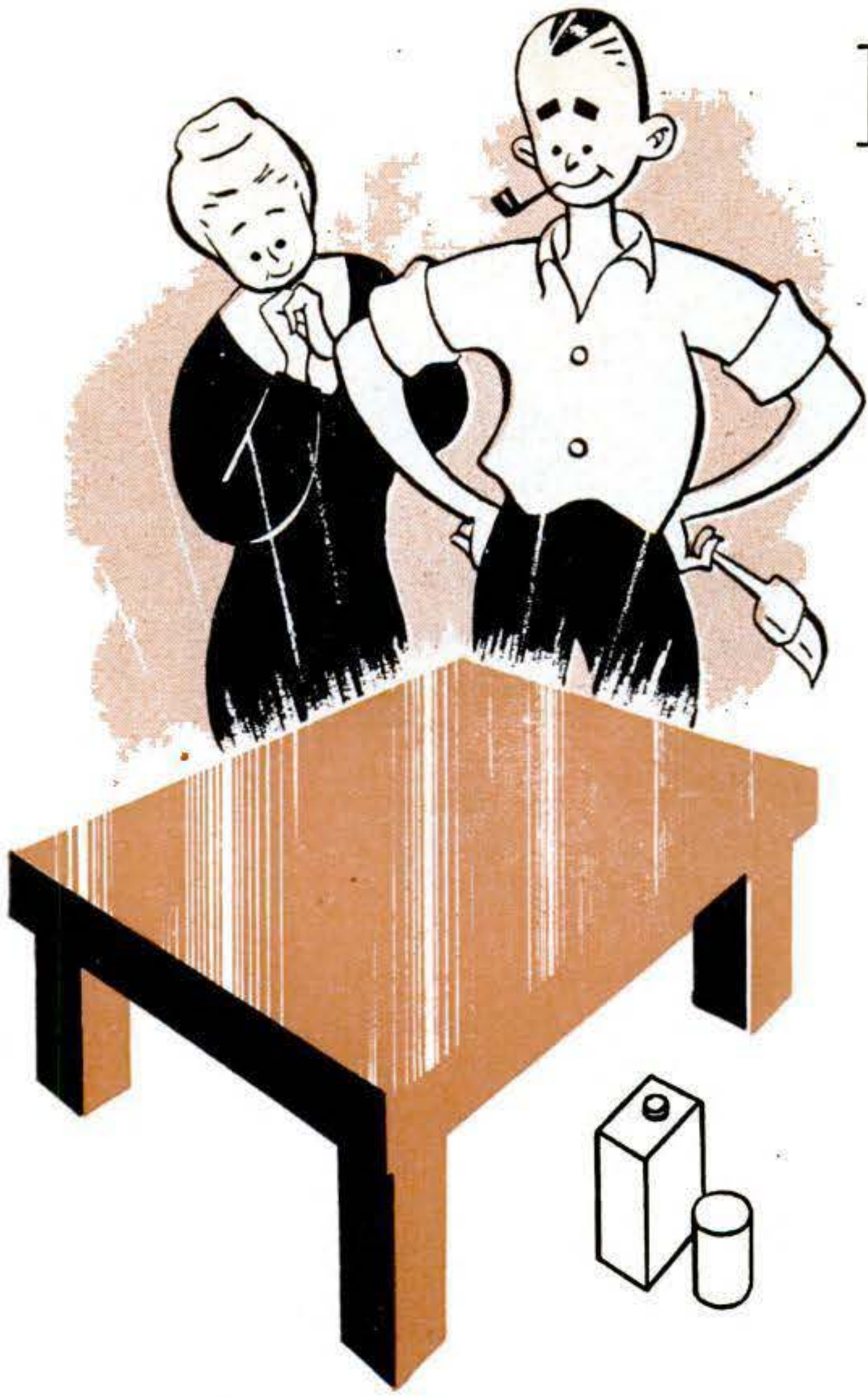
Flag Bracket Made from Pipe

IN ORDER to display the flag on holidays, I assembled a simple bracket from a few pipe fittings and installed it on the front of my house.

A floor flange, a short nipple to fit it, a 45-deg. elbow on the nipple, a 6″ length of pipe turned into the elbow, and a coat of aluminum-type paint completed the bracket. The inner diameter of the pipe must of course suit the flagstaff diameter. When the bracket isn't in use, a cork is inserted in the pipe to keep out water.—*George F. Luippold, Hampton, N. H.*



Copyrighted material



How to Seal

Standard materials and a simple home method give you a beautiful finish that just can't wear off.

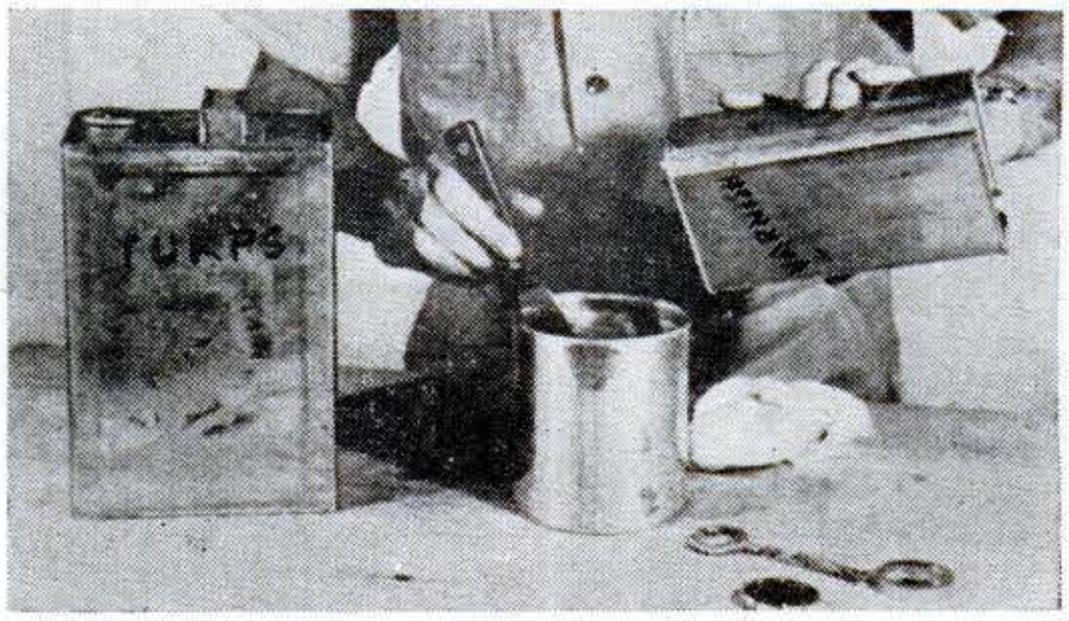
By Rollin H. Wampler

Consulting Chemist, Paints and Varnishes

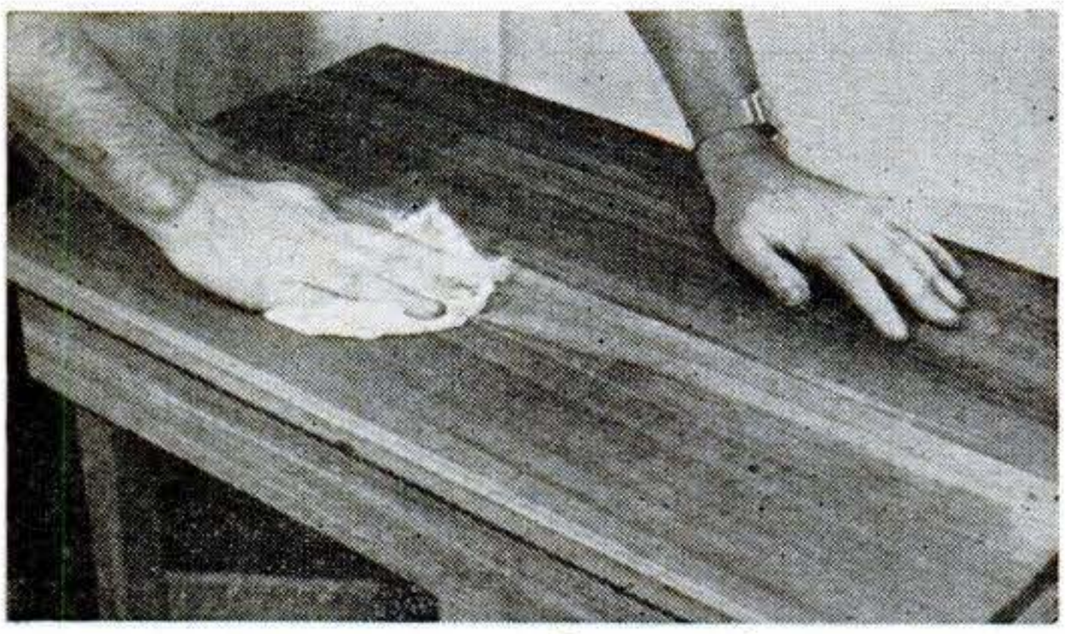
WITH most wood finishes beauty is really only skin deep. A surface film of varnish or other material gives good looks, fine weathering properties, and water resistance. What more can you ask? Not much—unless the piece is subjected to hard mechanical wear. In such cases you want the finish to get right down into the wood and key itself firmly into the fibers. In short, you want a penetrating finish. You can get one with the same materials you'd use for a surface job.

The photos show a stain-and-varnish finish suitable for cabinetwork and furniture. Assuming that you have filled all holes and scratches and sanded the surface smooth, you are ready for the first step—staining. The stain should be either of the water or

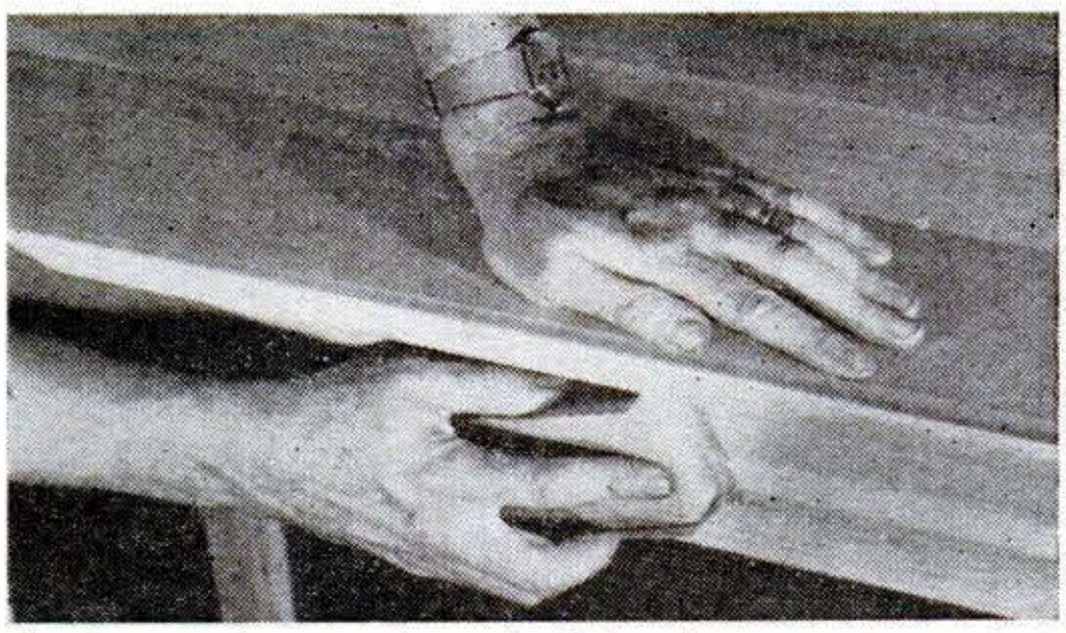
1. Staining, if required, is the first step. Use only a water or non-grain-raising stain. When dry, sand lightly with 6/0 paper.



2. Varnish for the penetrating coat is thinned with an equal volume of turpentine; for the sealing coat it is reduced only half as much.



4. Wait 10 minutes after applying the first coat; then wipe off any material that remains on the surface. Allow about four hours to dry.



5. Sand the surface lightly (again using 6/0 paper) and dust it off. Apply a second penetrating coat in the same manner as the first.

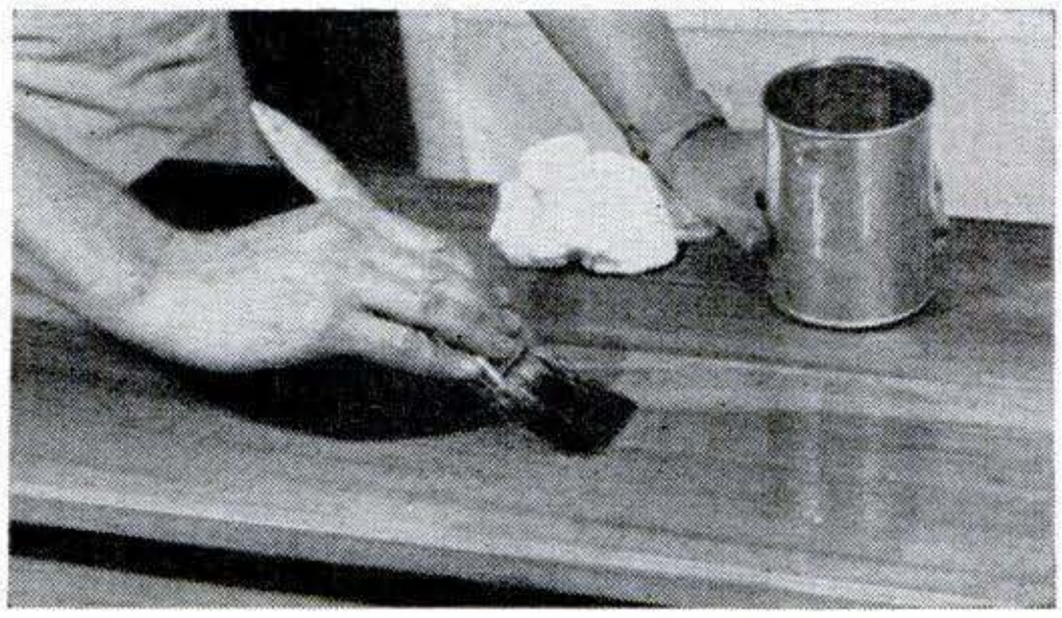
Copyrighted material

a Finish into Wood

non-grain-raising type. Don't use a pigment-wiping or penetrating-oil stain as these materials may interfere with the penetration of the locking coats. Apply the stain as directed on the can. After it is dry, sand lightly.

If there's any trick to applying a penetrating finish, it consists chiefly of letting the wood soak up an ample quantity of varnish or other material. Use good floor varnish reduced with an equal volume of turpentine. Brush on a coat liberally, let it set for a few minutes, and then wipe off any that remains on top. When this first penetrating coat has dried, sand it lightly. Apply a second coat in the same way.

Wood filler—required with open-grained woods such as oak, mahogany, walnut, or ash—is put on between the penetrating and sealing coats. Brush on thinned paste filler and allow it to set until the surface is uniformly dull and free from glossy spots. Wipe it off with straight strokes across the grain. Clean up by wiping lightly with the grain. Let dry overnight.



3. The penetrating coat is applied with a full brush. Put on all the wood will absorb, as you want to impregnate the top layers thoroughly.

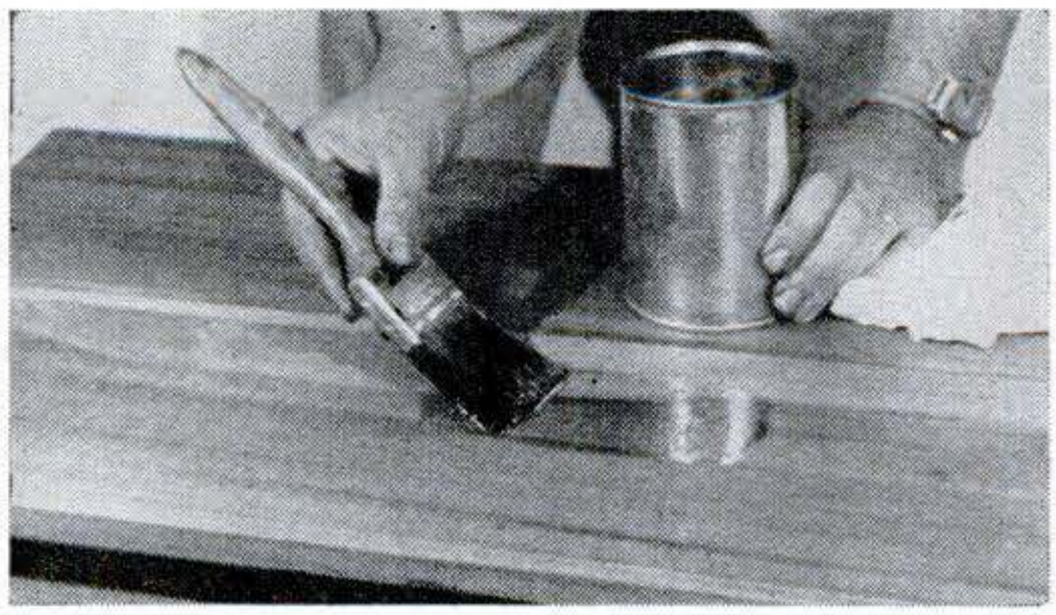
Next comes a sealing coat of varnish reduced with half its volume of turpentine. Apply a thin coat uniformly over the entire area. Let it dry overnight and sand lightly.

The final coat is floor varnish at full body. When it is thoroughly dry—which may take two or three days—go over it with a 000 or 0000 steel-wool pad loaded with paste wax. Stroke with the grain. Polish with clean rags. If the finest appearance is desired, add one or two extra full-body coats, wet-sanding between. When the last coat is thoroughly hard, rub with rotten stone or fine pumice and oil.

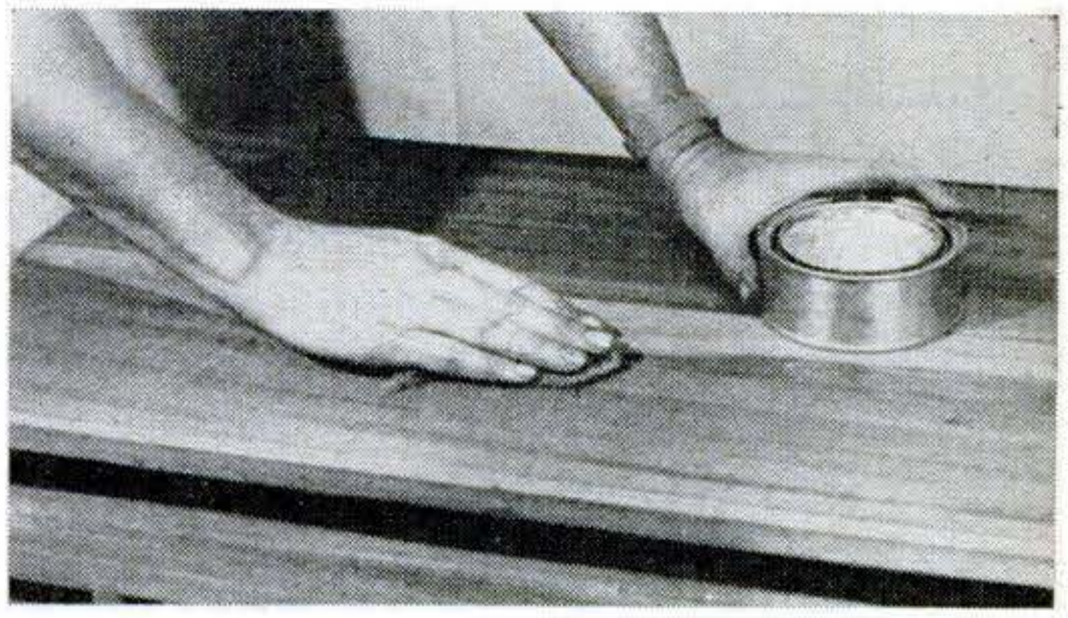
Now if you bear in mind that it is the penetrating coats that make the difference in this system, you will readily see how simple it is to adapt the technique to lacquer and enamel as well as to varnish. Use a tough material—linoleum lacquer, for example, or porch and deck enamel. Thin it with lacquer thinner or turpentine as the case may be, and follow the sequence described. When using lacquer, be sure to wipe off excess material within about three minutes; allow penetrating and sealing coats to dry one hour and the final coat eight hours or more.

For service out of doors, where a finish has to withstand weathering as well as mechanical wear, a penetrating job has extra years of life. Lacquer has poor weathering qualities on wood, so use varnish or enamel. If you choose the former, get the best spar varnish and apply three full-body coats over the sealer. Allow each 48 hours for drying.

When enameling porches, use one or two coats of thinned deck enamel on the raw wood. The excess need not be wiped off. Follow with one or two coats at full body.

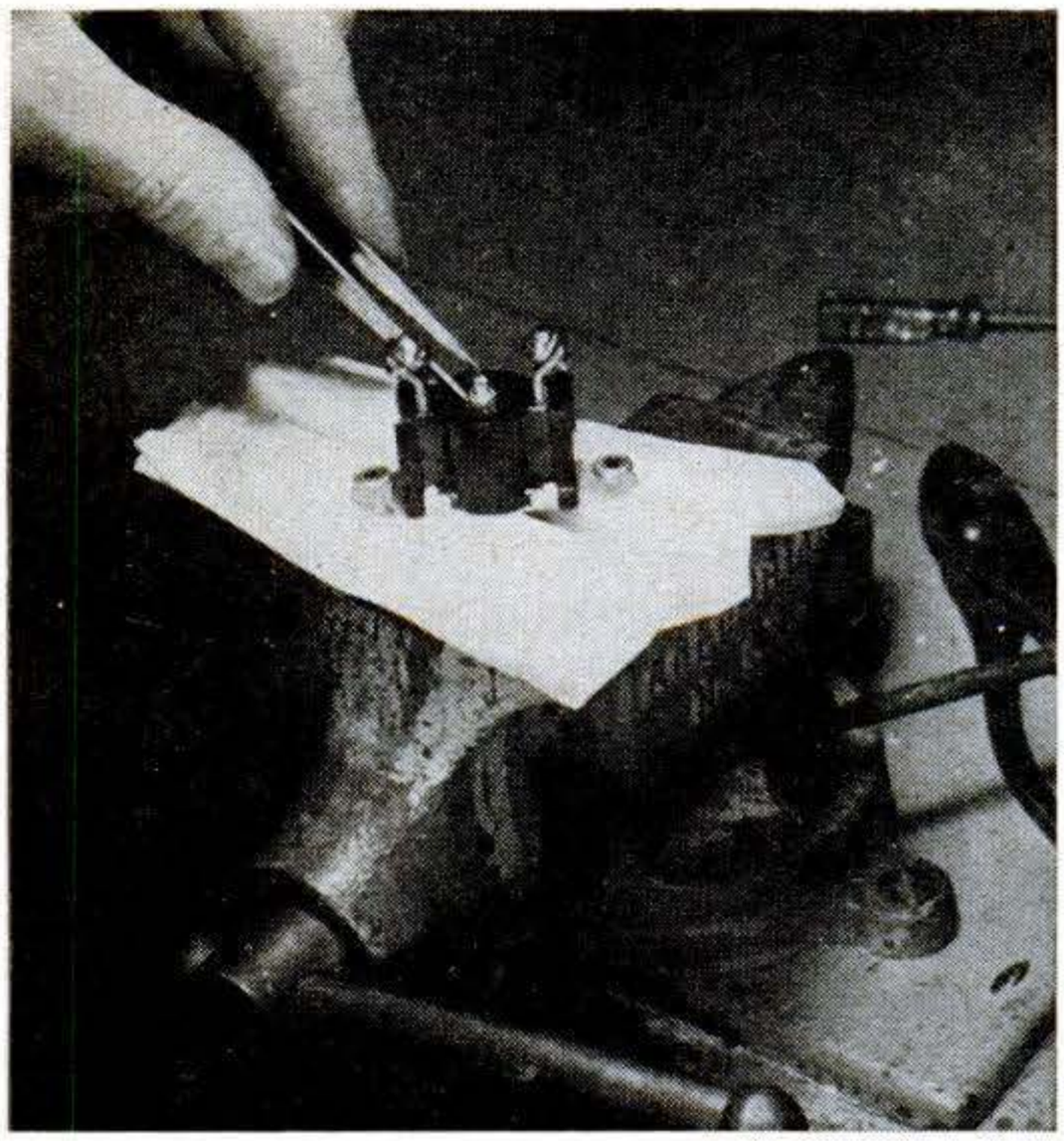


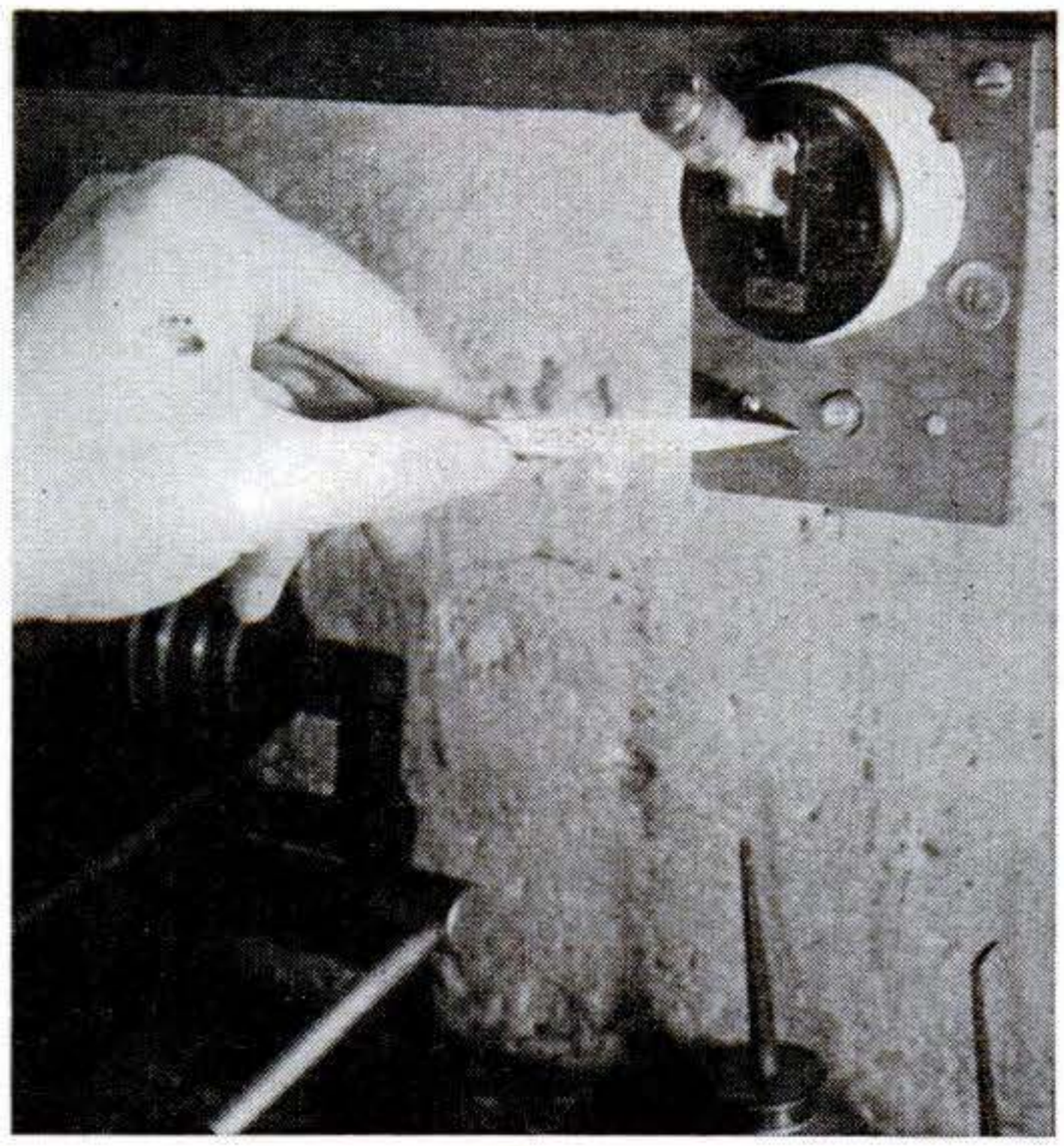
6. A sealing coat and one or more full-body coats are brushed on uniformly. Don't wipe off the excess, but allow ample drying time.



7. Load a pad of steel wool with paste wax and go over the top coat. For a still finer finish, build up enough surface to permit rubbing.

Copyrighted material



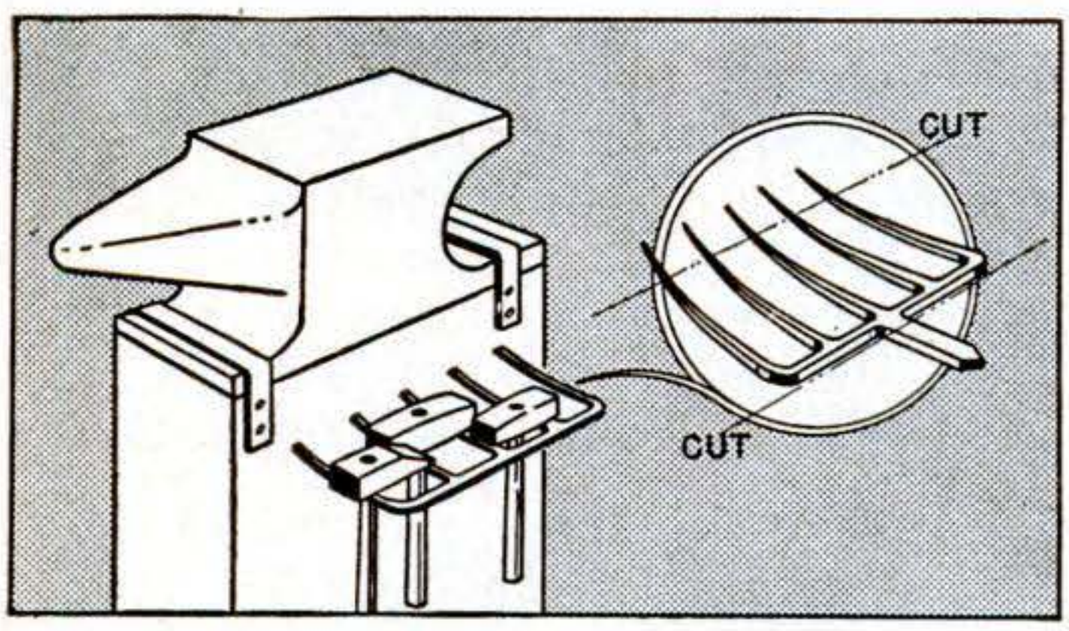


Circuit Breaker Guards Motor and House Fuses

SHOP motors not equipped with overload trippers can be protected, and house fuses kept from blowing, by means of inexpensive circuit breakers now available at war-surplus outlets. A push on a button resets them after they "blow." Although they are commonly set to open at 15 amp., you can readjust them to 9 or 10 amp. to safeguard motors drawing 4 to 6 amp.

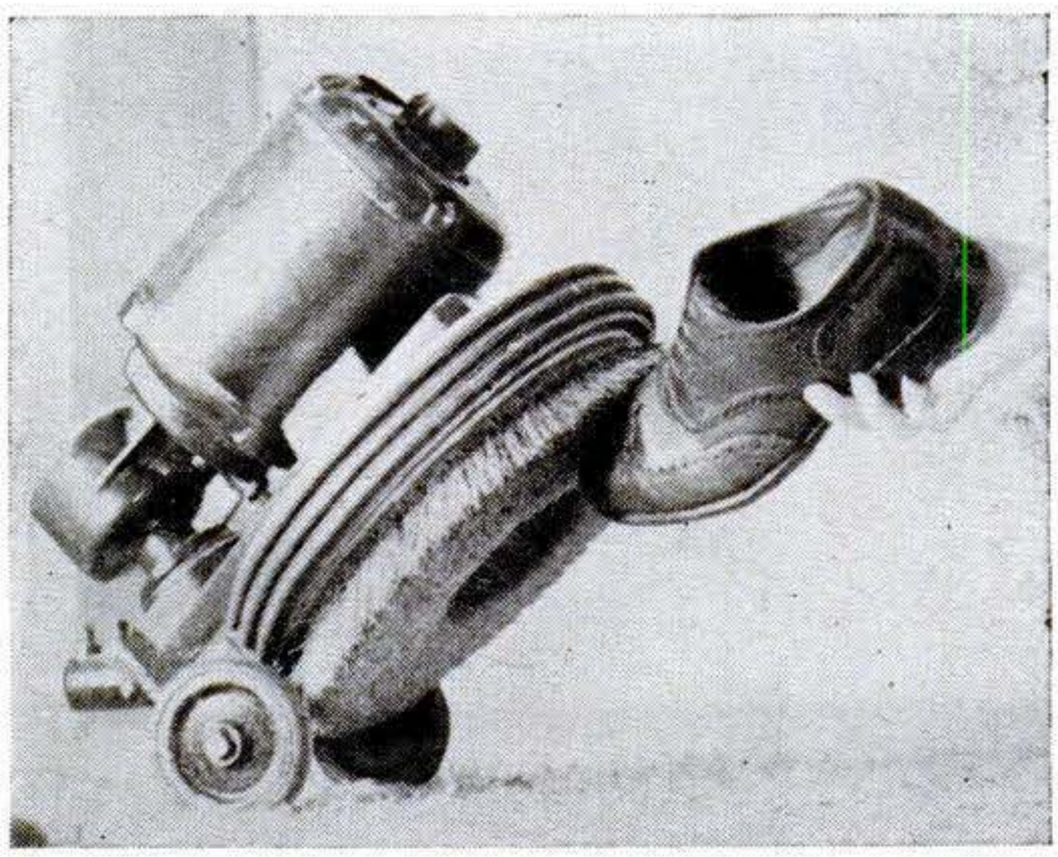
Pinch off the sealing wax on the adjustment screw in back and loosen the lock nut. Rig up a temporary electric load of about 1,000 watts, using toasters or other appliances, and feed this load through the circuit breaker. Turn the adjustment screw until the device just trips. A thermostatic element heats up to open the circuit. If overloaded a second time while still hot from the first, it will trip prematurely, so give it time to cool between trials.

Tighten the lock nut, apply sealing wax or nail polish, and mark the new rating on the circuit breaker. Mount it near the motor switch with the reset button accessible.



Fork Makes Handy Anvil Rack

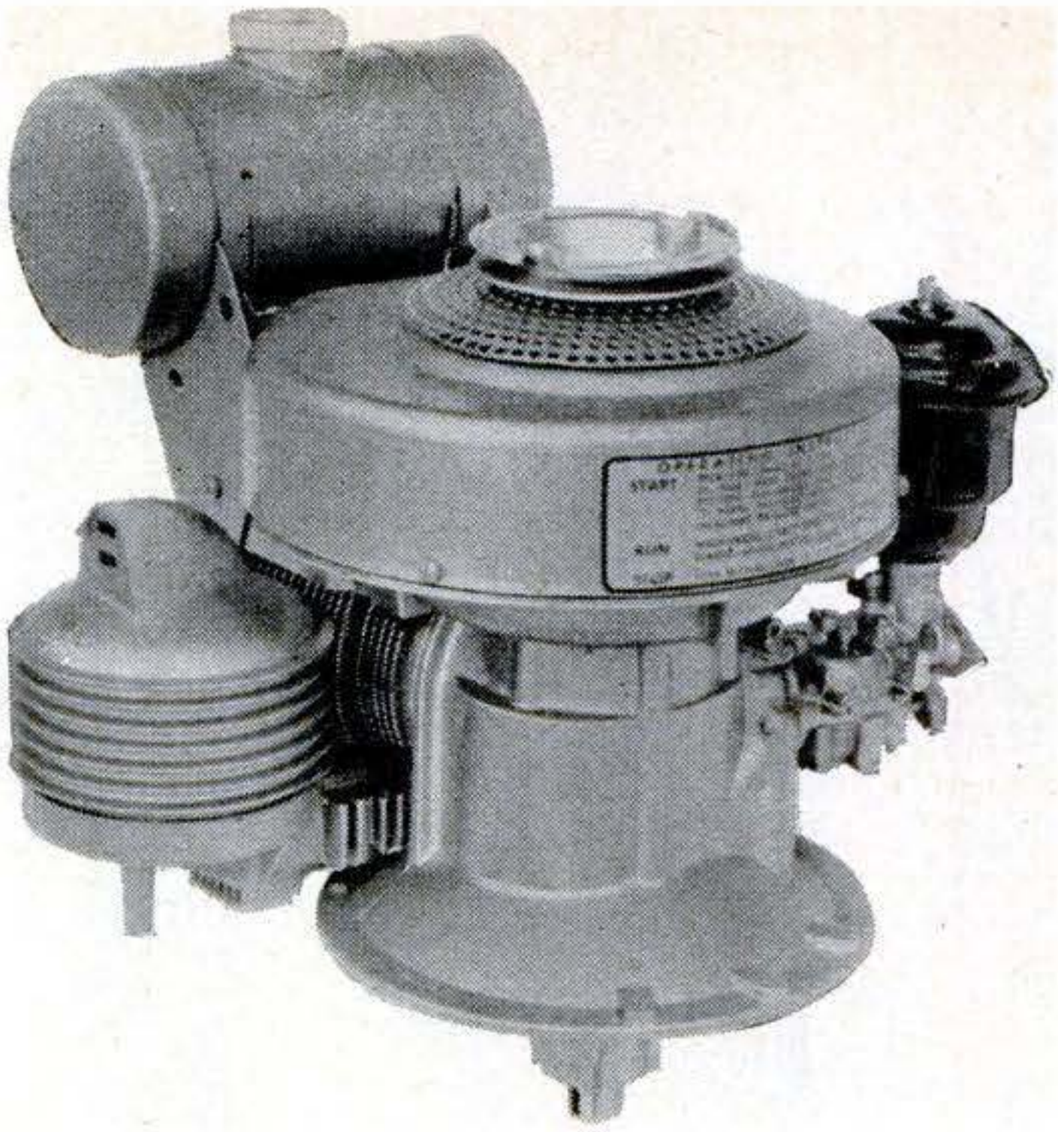
TIRED of picking up sledge hammers and cutters from the floor of the shop, I found an old pitchfork, cut off the shank, and trimmed the tines to a length of 8". After drilling ¼" holes in the anvil block at a convenient height and spaced to suit the tines, I drove the altered fork into the wood. Now I can quickly lay my hands on the tool I want. It's always handily close to the anvil.—*Robert J. Roder, Reist, Alta.*

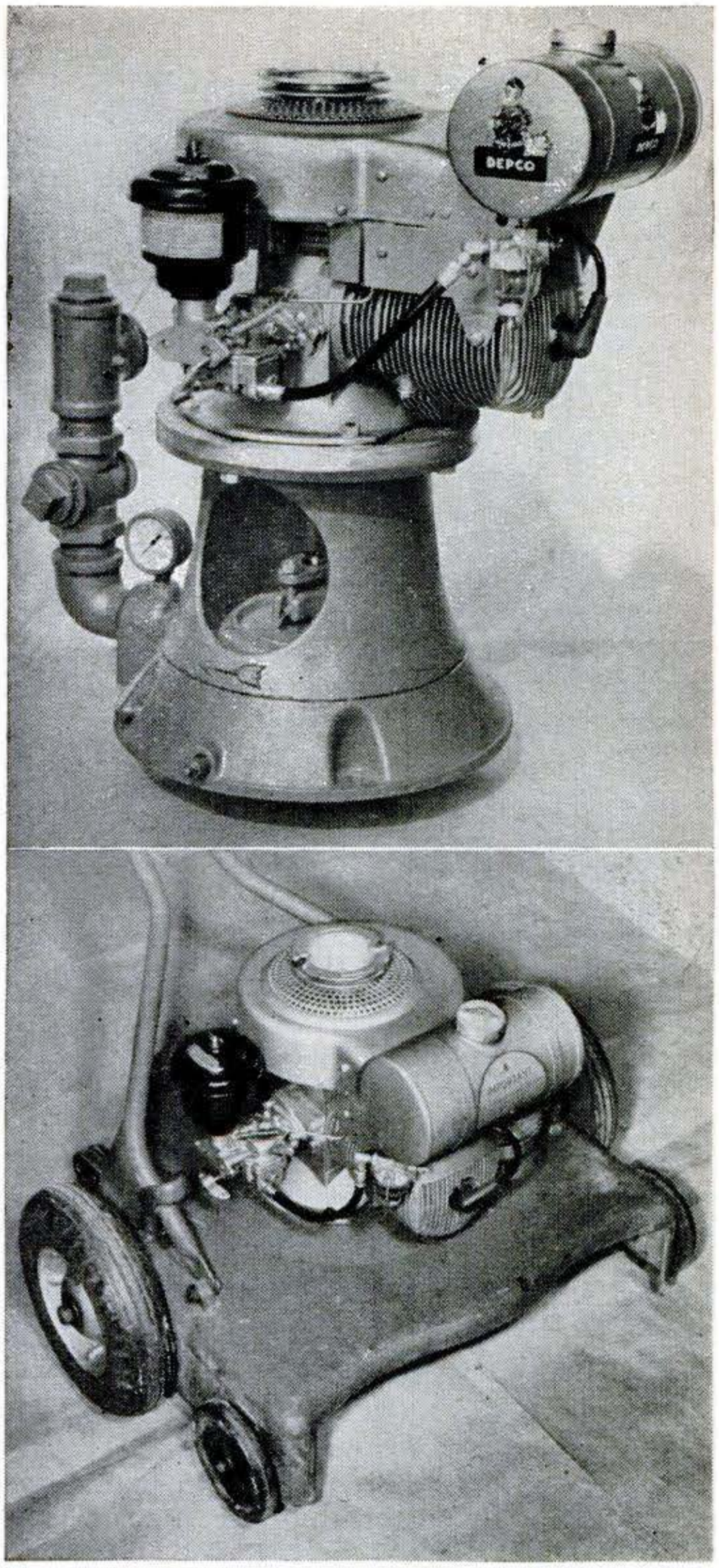


Floor Waxer Gives Fast Shine

IF YOU can get next to a power floor waxer, shining your shoes ought to be no problem at all. Tilt the machine to expose the brush, put polish on the shoes, and let the motor shine up your footwear.—*Russell W. McCandless, Manhattan, N. Y.*

Copyrighted material





New Engine Has Vertical Shaft

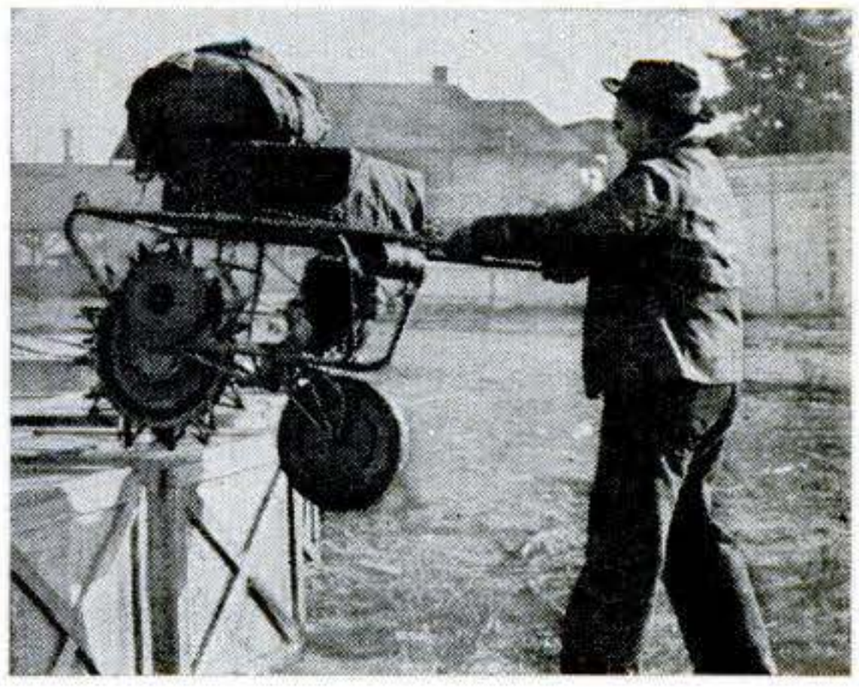
SUITED for use with rotating-scythe lawn mowers and vertical pumps, a new single-cylinder air-cooled engine has many interesting engineering features. Although it weighs only 24 lb. complete, it delivers 2½ hp. at 2,500 r.p.m. The price of the engine, which is made by McCulloch Motors Corp., of Los Angeles, is $79.50.

The high power-to-weight ratio is secured in part through use of aluminum-alloy die castings for the cylinder, crankcase, and flywheel. (The cylinder is lined with a cast-iron sleeve.) Another weight saving comes from the use of the two-cycle principle, with its elimination of valves, camshaft, and associated parts. A patented "reverse-flow" scavenging system that uses guide vanes at the intake ports, together with a special high-tension ignition system, are said to provide easy starting.

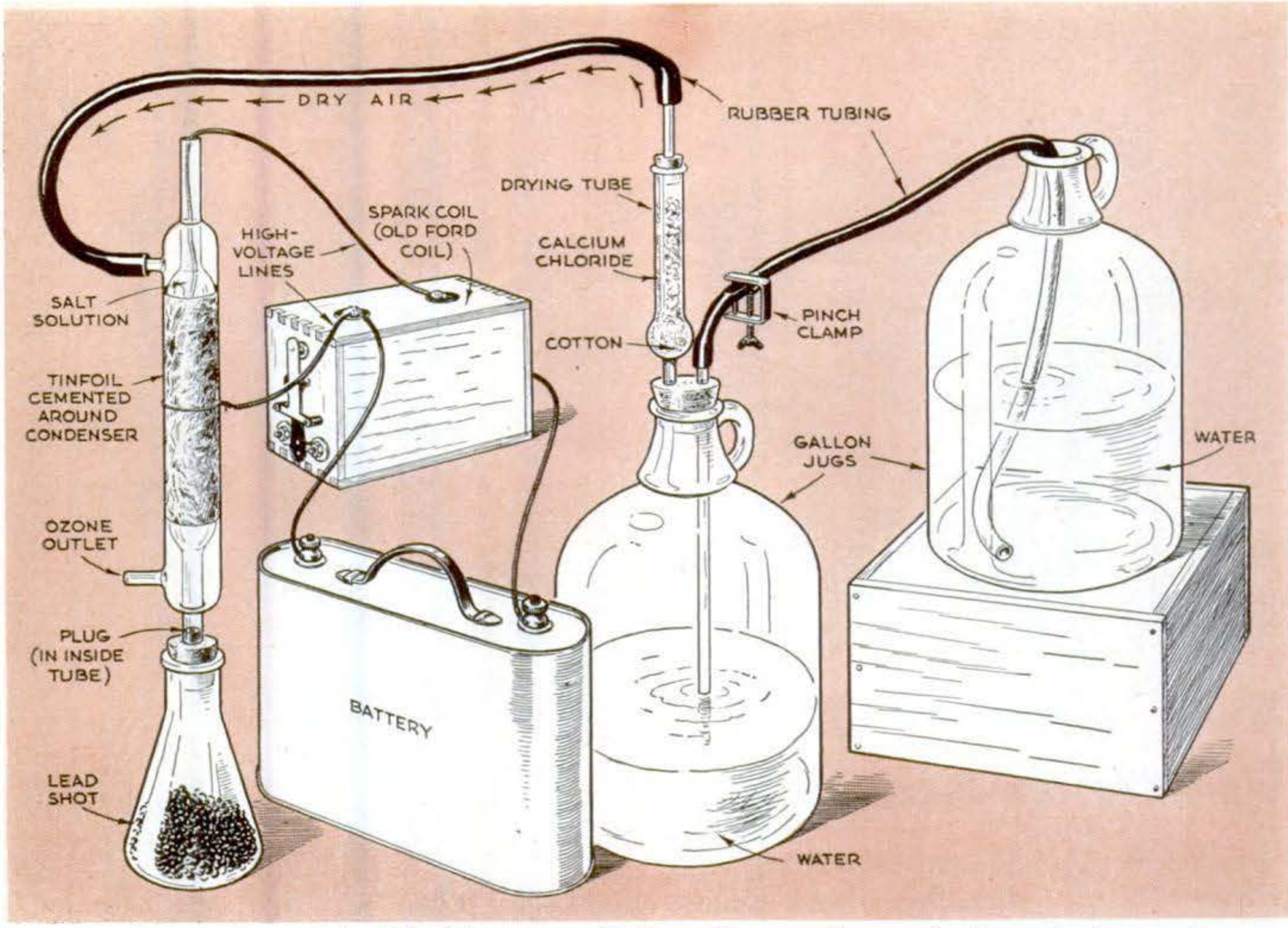
Other features of the little engine include anti-friction bearings throughout, a visible-sediment fuel filter, an air-vane governor, and an oil-bath air filter.

Wheelbarrow Uses Motor

ROUGH ground is scarcely an obstacle for this home-made wheelbarrow built by Harold T. Austin, of Seattle, since its spiked driving wheel will climb almost everything but a tree. At the right Austin is shown giving his contrivance a test hop over a pile of crates. A two-wheeled 125-lb. job with a bent tubular frame, it is driven by a 1½-hp. air-cooled engine through a chain and V-belt speed-reduction system. Wheelbarrow handles fitted with engine controls steer the device, which can carry a 250-lb. payload.



Copyrighted material

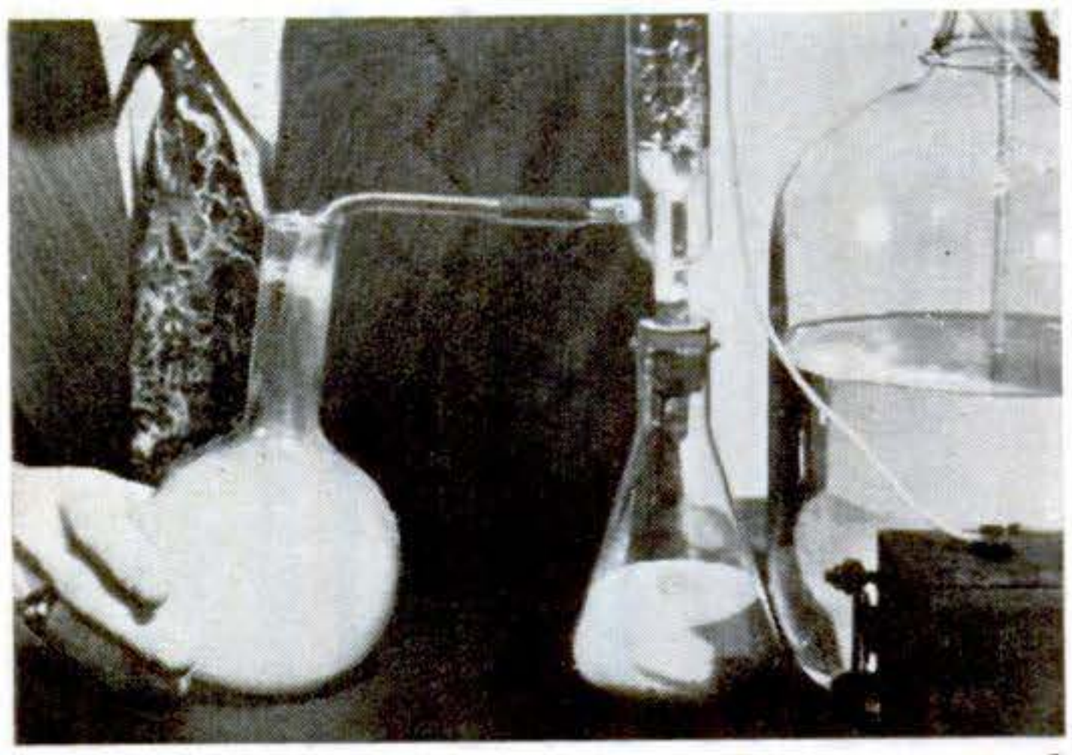


Ozone may be generated with this setup. Siphoned water forces air through the condenser.

How Elements Put on Disguises

Soot, pencil lead, and diamonds are all masquerades of pure carbon, its molecules playing Jekyll-Hyde.

By Kenneth M. Swezey



This test shows you have made ozone. Led into a flask containing a little turpentine, ozone from the generator reacts with the vapor and forms a white cloud of ozonide of turpentine.

INCREDIBLE as it may seem, a hard sparkling diamond, soft greasy graphite, soot from a candle flame, and charcoal are exactly the same thing, chemically speaking. Each consists of the element carbon.

Such different forms of the same element are called allotropes. Scientists have not yet fully solved the mystery of allotropes, but evidently the differences apparent in various forms of the same element result from different arrangements of the molecules or of the atoms in the molecules.

Some elements with such Jekyll-Hyde characteristics are so amenable to change that you can readily transform one allotropic form into another. Oxygen, and its allotrope ozone, are a good example.

The oxygen we breathe is a gas with molecules made up of two atoms of the element oxygen. Ozone molecules, on the other hand, have grabbed themselves an extra atom, and this three-atom type of oxygen has far differ-

Copyrighted material

ent properties from the garden variety found in the air. Because of these properties, ozone is useful to us in a number of ways. (See page 162).

Several methods are used commercially and experimentally to produce ozone, but you can do it most simply by passing a high-voltage electrical charge through air. This causes molecules of ordinary oxygen to attach another atom to themselves.

Building an Ozone Generator

A Model-T Ford spark coil will supply the high voltage. For the generator proper, use an all-glass condenser. Cement a wide band of tin foil around it, place a plug in one end of the inside tube, and minimize the danger of shock by mounting this end in a stopper pressed into a weighted flask.

Connect one of the high-voltage terminals to the tin foil and immerse the other in a solution of salt water placed in the inside tube. The remainder of the apparatus merely forces a stream of dry air through the jacket of the condenser.

When the apparatus is all set, fill the top jug with water, start it siphoning into the bottom one, and connect the spark coil to the battery. You will notice a faint bluish light between the tin foil and the inside condenser tube, and within a few seconds you should be able to detect the characteristic odor of ozone as it comes from the outlet.

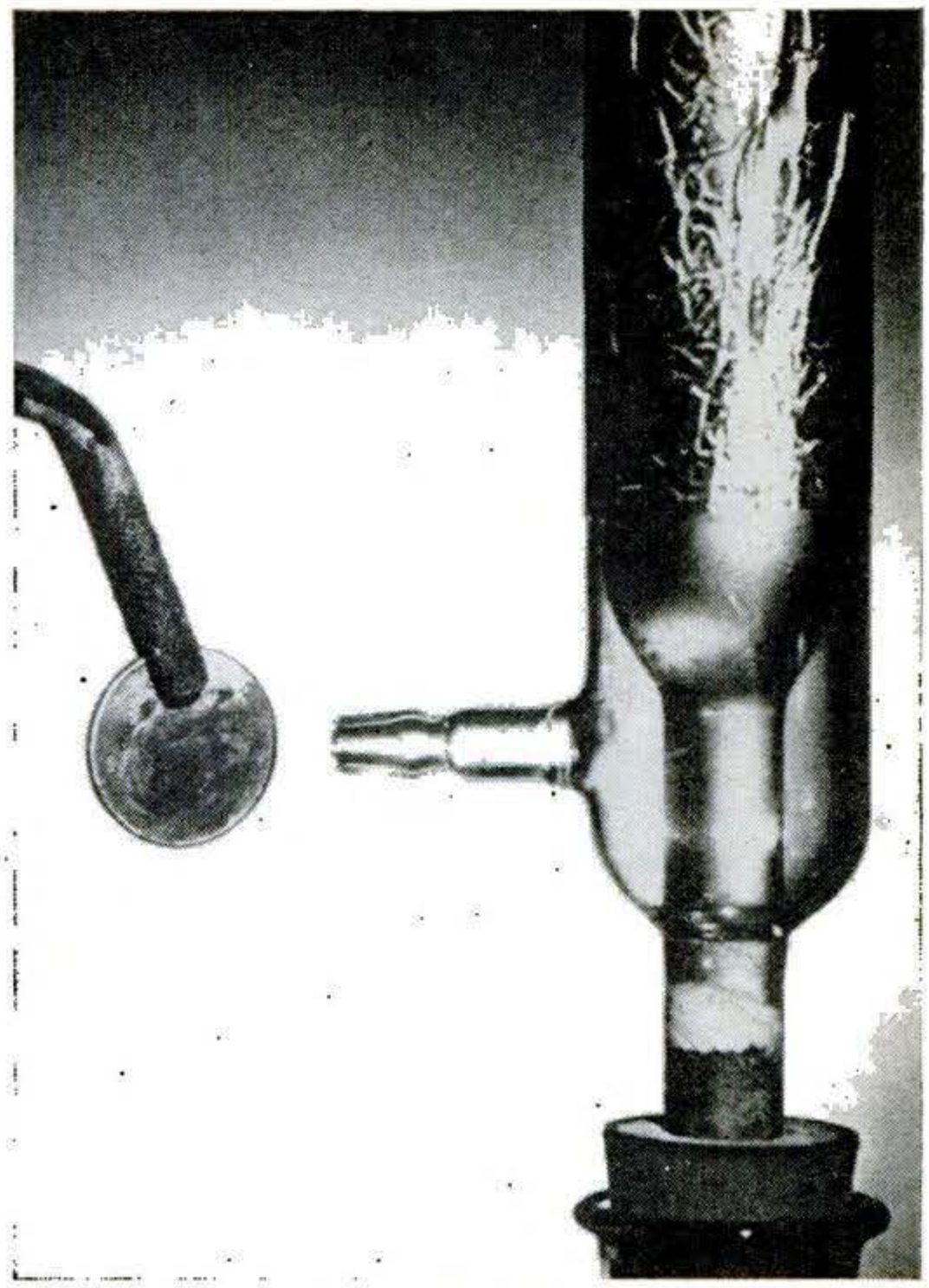
Strongly corrosive, ozone reacts more vigorously with many substances than does ordinary oxygen. In fact, in some cases it reacts where oxygen does not. Silver is one instance. If you polish a silver coin, heat it medium hot, and hold it in ozone, a dark film of silver peroxide will form.

Ozone Liberates Iodine

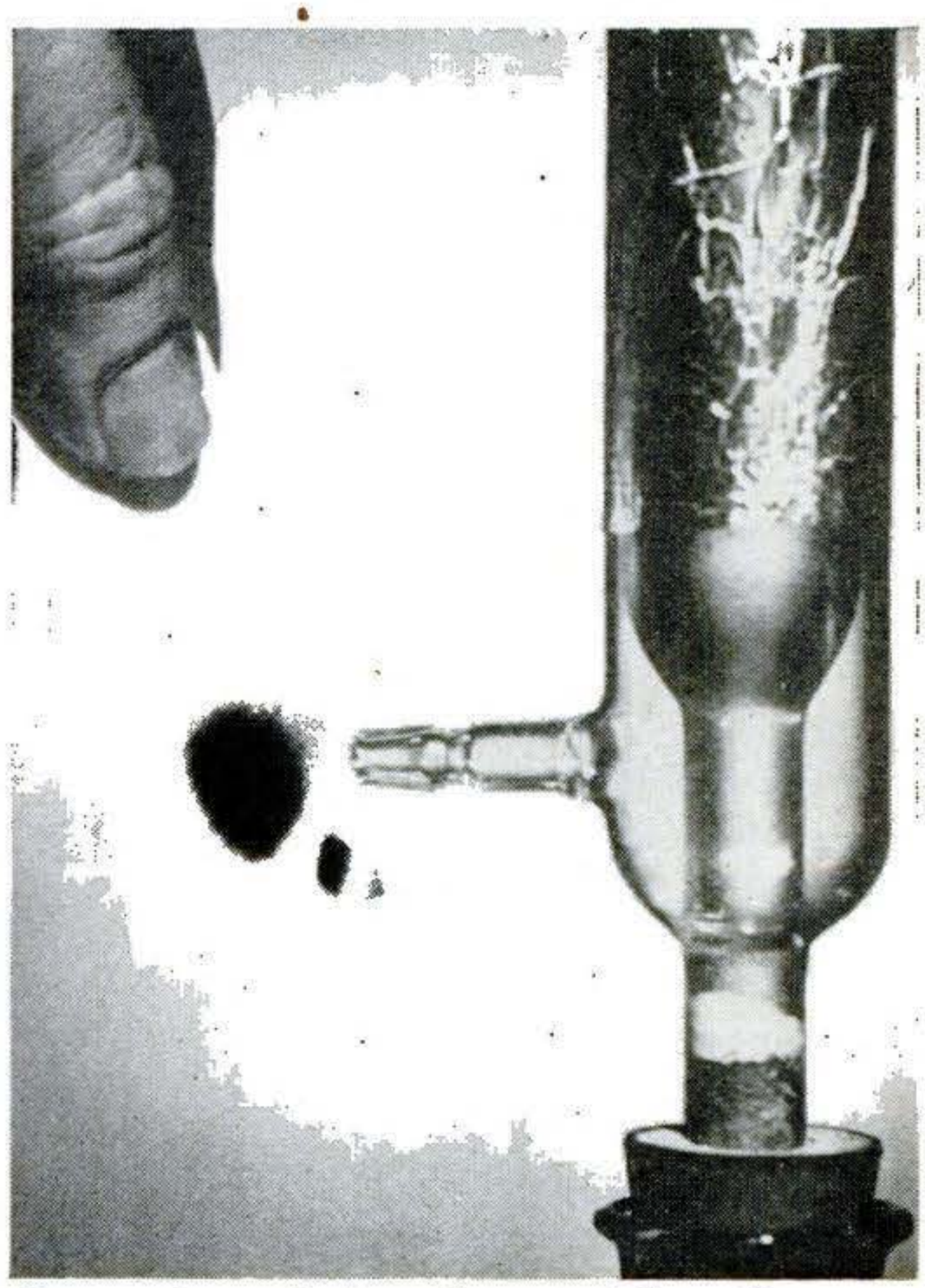
Another characteristic of ozone is that it liberates iodine from iodides. You may demonstrate this by dissolving a few crystals of potassium iodide in a little water and adding enough cornstarch to make a thin paste. Then apply the paste to a strip of filter paper and hold the paper near the outlet of your ozone generator. Liberated iodine will react with the starch, forming a tell-tale blue-black color.

Sulphur also occurs in several allotropic forms. Two are crystalline of entirely different structure. A third has the plastic quality of rubber.

In one of the crystalline forms, the crystals are needlelike, or monoclinic; in the other

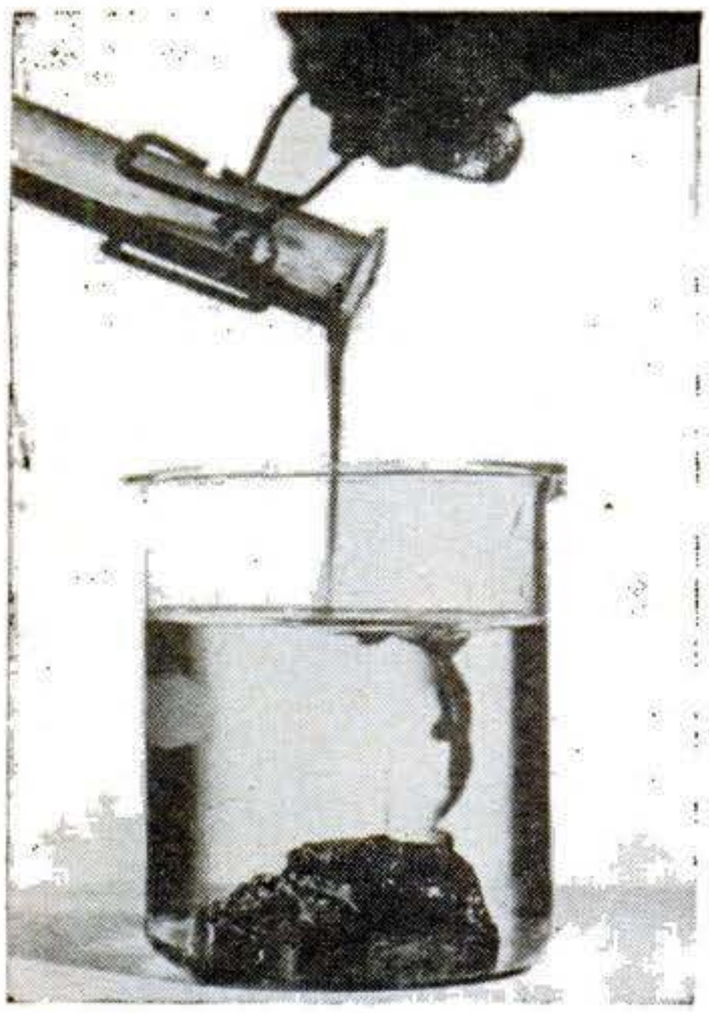


Ozone reacts vigorously with many substances that ordinary oxygen does not affect. Silver is one example. Hold a heated silver coin in ozone and silver peroxide will darken it.



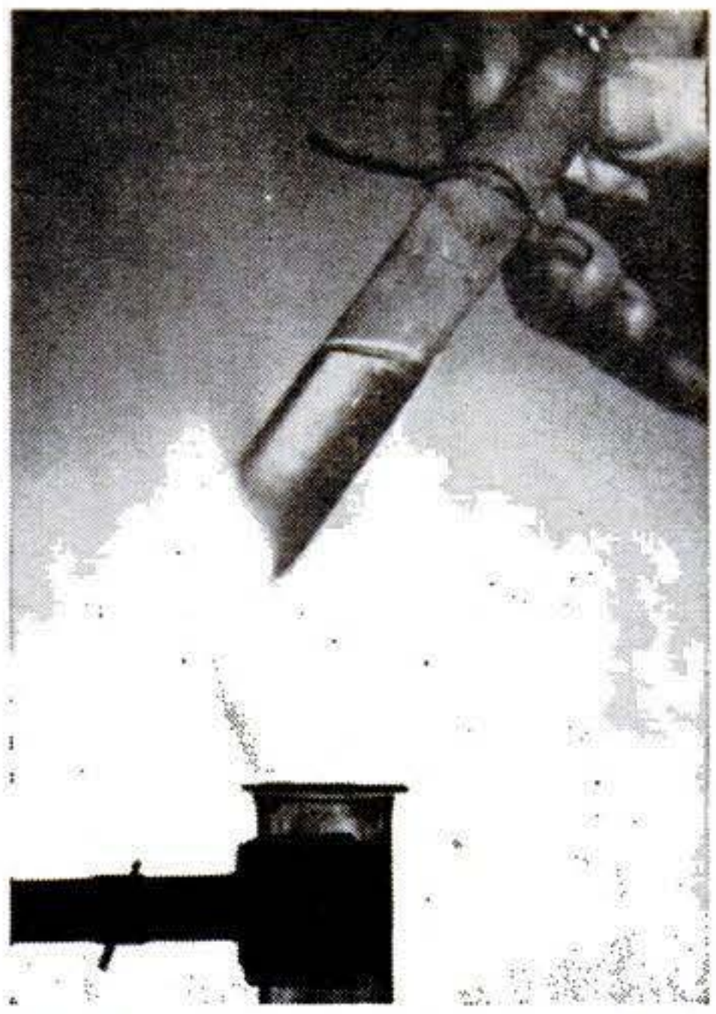
Ozone frees iodine from iodides. You may show this by applying a paste of starch and water containing potassium iodide to filter paper and holding the paper in the stream of ozone.

Copyrighted material



Sulphur occurs in a number of allotropic forms. One may be molded like putty. To produce this, heat some sulphur until it is thicker than molasses and pour into cold water.

Red phosphorus can be made from the white form. Slightly warm some of the latter and add a speck of iodine. Iodine acts as a catalyst in effecting the change in forms.



White phosphorus in powder form flames up spontaneously in open air. The red variety produced at the left may be quickly changed back into the original white phosphorus.

they are rhombic, shaped somewhat like little coffins. Rhombic crystals are stable below 96 deg. C., while monoclinic crystals are stable from that point to the melting temperature—about 114.5 deg.

To produce monoclinic crystals, fill a test tube about a third full of powdered sulphur, and heat carefully so that the sulphur melts with the least possible heat. Pour the melted sulphur into a cone formed from a sheet of filter paper, holding the cone by one edge in your hand. When crystals have begun to form across the surface, pour the excess liquid into cold water. Break open the cone when cold and notice the crystals.

For the rhombic type, dissolve as much sulphur as you can in about 10 ml. of carbon disulphide. (Keep this far from any flame, for it is highly inflammable.) Then filter the solution and pour into a small beaker. Cover with a piece of glass and stand it in a cool, well-ventilated room to evaporate. When all the solvent is gone, the bottom of the beaker will be covered with the coffin-shaped crystals.

To make the third type, heat a third of a test tube of sulphur so strongly that it darkens and boils. Don't worry if the vapors at the mouth of the tube catch fire. When thicker than thick molasses, pour the sulphur into a beaker of water. It will cool into a puttylike mass.

Although all these forms of sulphur are chemically the same substance, they look different, and only the crystalline forms are soluble in carbon disulphide. Left alone at room temperature, the monoclinic and plastic sulphur change to the rhombic form.

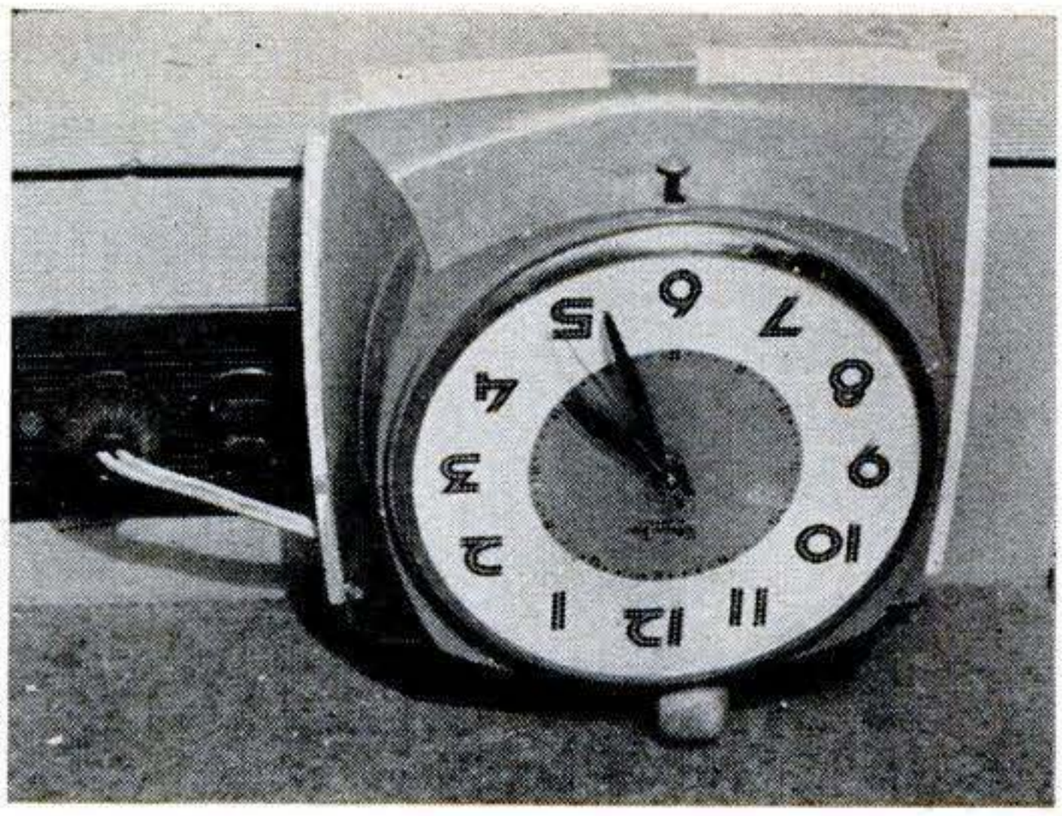
Two common allotropic forms of phosphorus also are remarkably different. White phosphorus is highly poisonous and often catches fire spontaneously. Red phosphorus is not at all poisonous and ignites only at higher temperatures.

White Phosphorus Changed to Red

Red phosphorus is easily made from white. Drop a pea-sized piece of the latter into a large test tube, supported vertically. (Never touch this substance with your hands. Use a pointed knife or tweezers and cut it under water.) Heat the tube gently until the lower part is filled with vapor. This will catch fire, but will almost go out when the oxygen in the tube is exhausted. Remove the heat and add a bit of iodine. Almost instantly, the white phosphorus changes to red.

The red phosphorus just formed can be changed back to the white variety by suspending a smaller test tube, filled with cold water, in the tube containing the red. Heat strongly. At first the phosphorus burns, but then it begins to distill, coating the bottom of the cool inner test tube with white phosphorus. Because this white phosphorus is so finely divided, it will catch fire spontaneously a few seconds after you bring it into the air. END

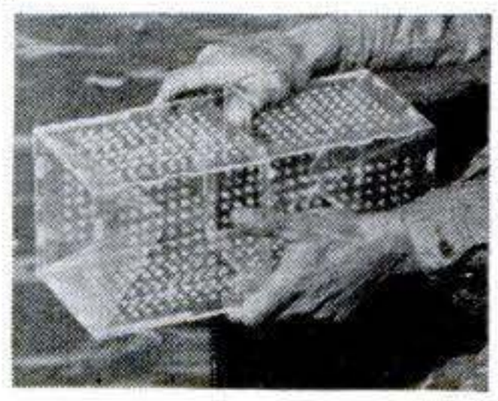
Copyrighted material



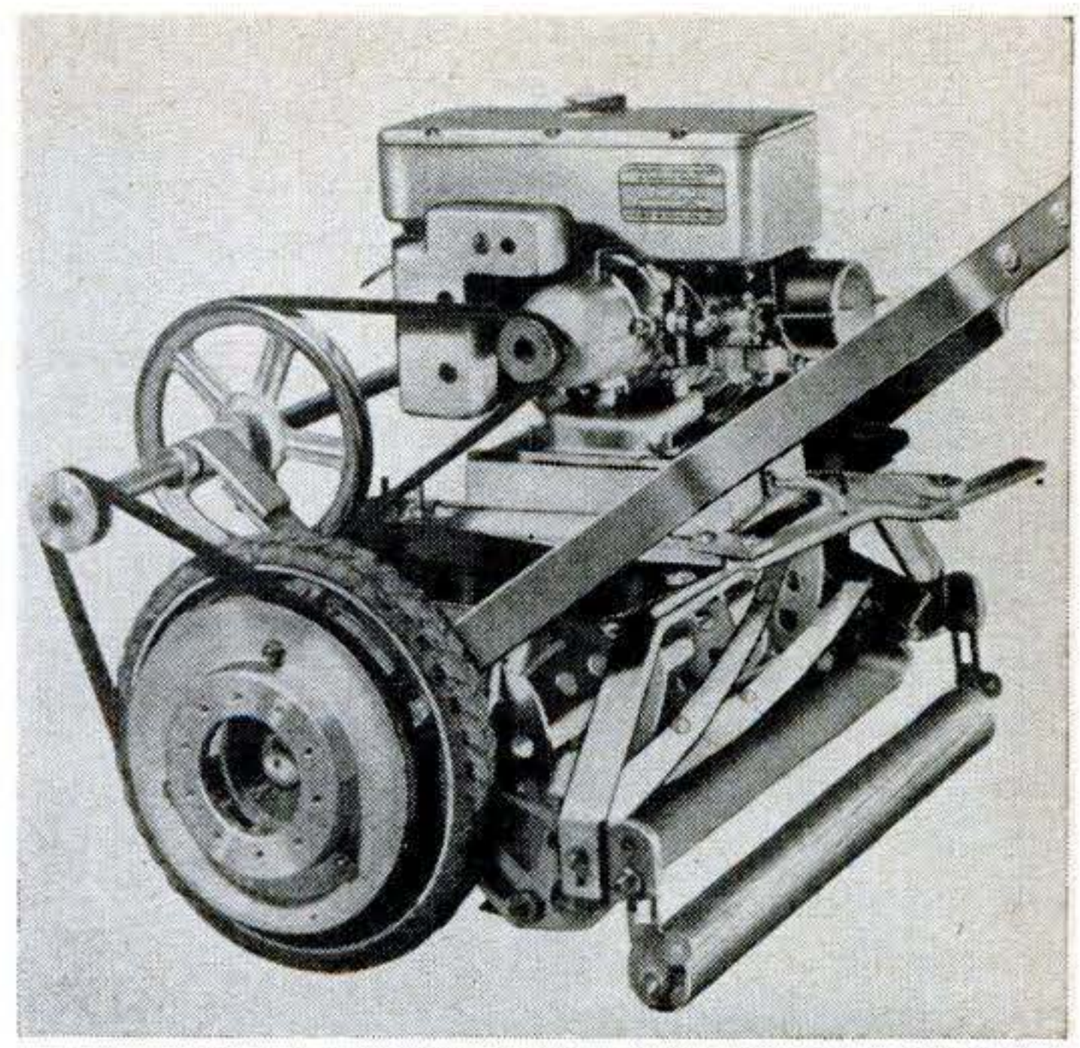
Silencing a Noisy Clock

ELECTRIC clocks may become noisy when the sealed-in lubricant settles. A simple cure is to turn the clock upside down and allow it to run that way for several days. Select a fairly warm place to help thin the lubricant.—*D. J. Bachner, Jackson Heights, N. Y.*

Plastic Box Traps Minnows



THE tendency of minnows to "school" is said to make this bait trap particularly effective since one or two will lure others into the transparent box. It folds compactly to fit the tackle box. Lewis E. Hamel Co., Inc., Rochester, N. Y., sells the trap for about $4.



Attachment Motorizes Mower

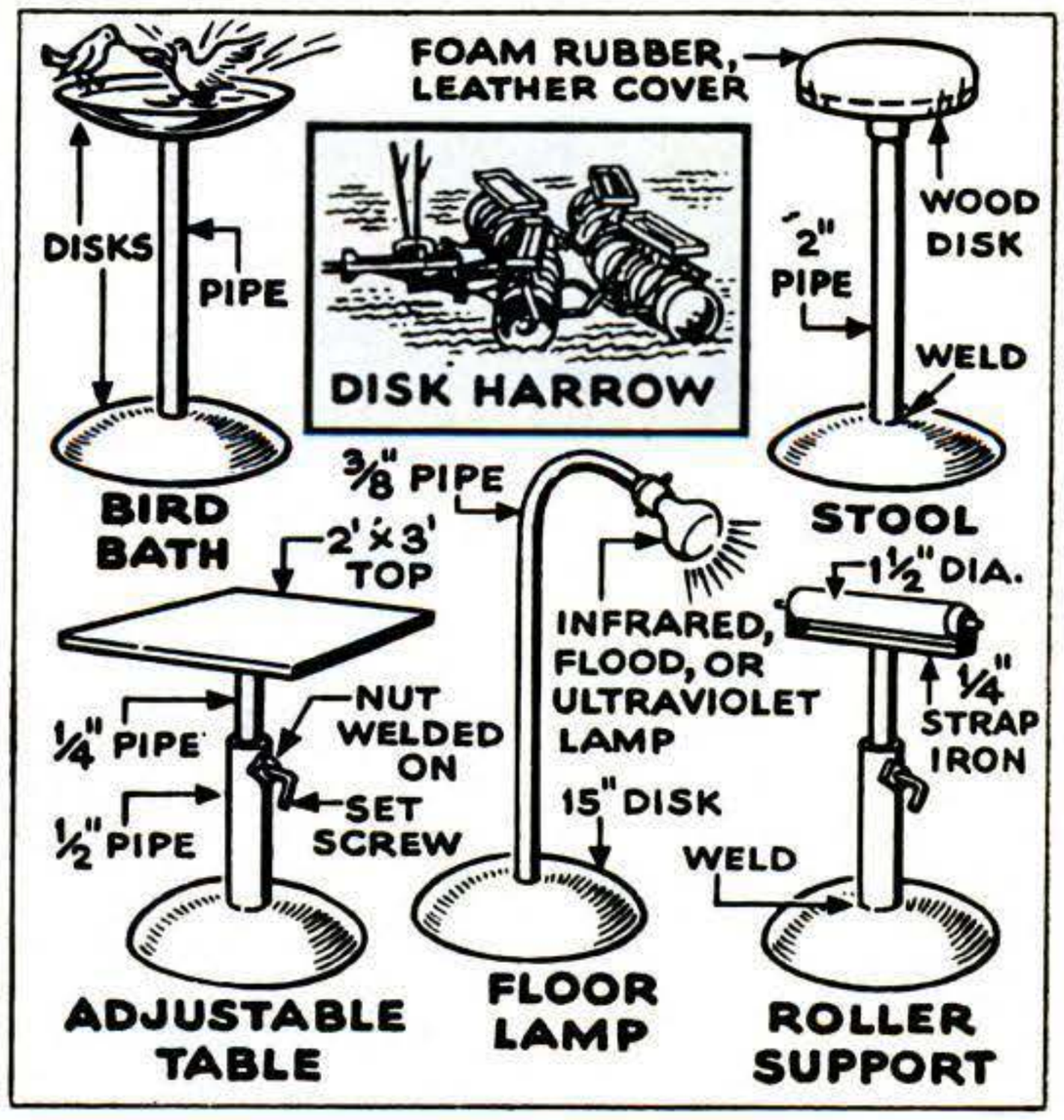
A SET of attachments and a light gasoline engine are now on the market for converting an ordinary lawn mower to power operation. The engine is a 2-cycle, 1-hp., air-cooled unit that weighs 17 lb.; the attachments are made of a magnesium alloy to keep the added weight to a minimum.

The Royal Oak Lawn Mower Shop, Royal Oak, Mich., makers of the attachment, claim that it can be assembled in an hour or less. All parts are numbered to make the job foolproof. Gardeners who already own a suitable motor can buy the attachment alone for about $28; the motor, also sold separately, costs about $62.

Discarded Harrow Disks Serve as Shop Pedestals

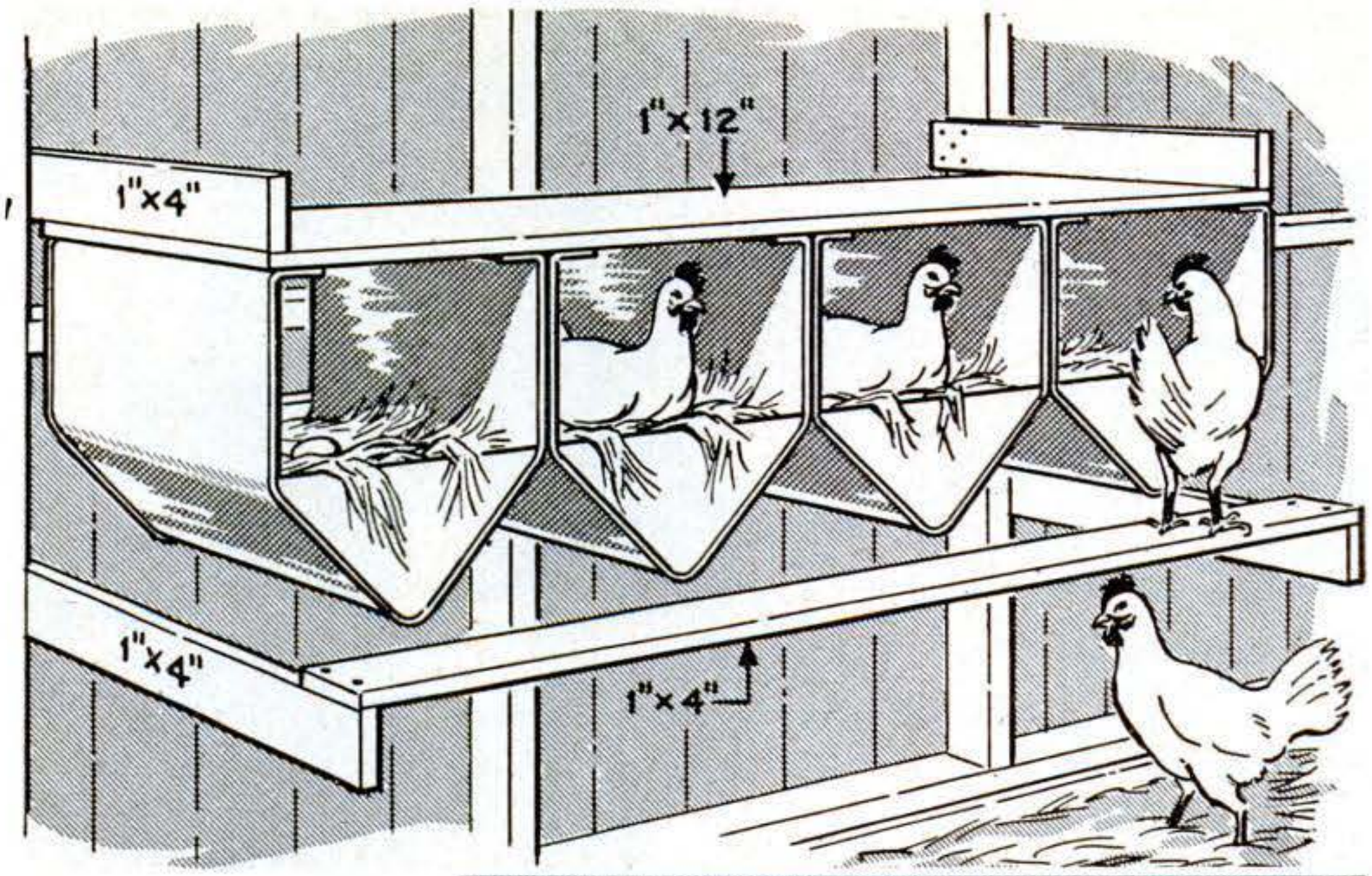
WITH iron and steel still scarce and costly, I couldn't bring myself to throw away my old disk-harrow cutters even after I had replaced them with a new set. I'm glad I saved them, because I have discovered countless uses for the 15″ hard-steel platters.

A few of them are indicated in the sketches at the right. In most applications the disks serve as bases for the various objects. They are sufficiently sturdy by themselves, but can be weighted where necessary for even greater stability. A length of pipe is welded to each disk to make the standard, and the top is also welded on. One standard with interchangeable tops may be used for the adjustable table and the roller support. The latter is handy for feeding long stock into a circular saw or other power tool. —*Neil P. Salter, Allentown, Pa.*



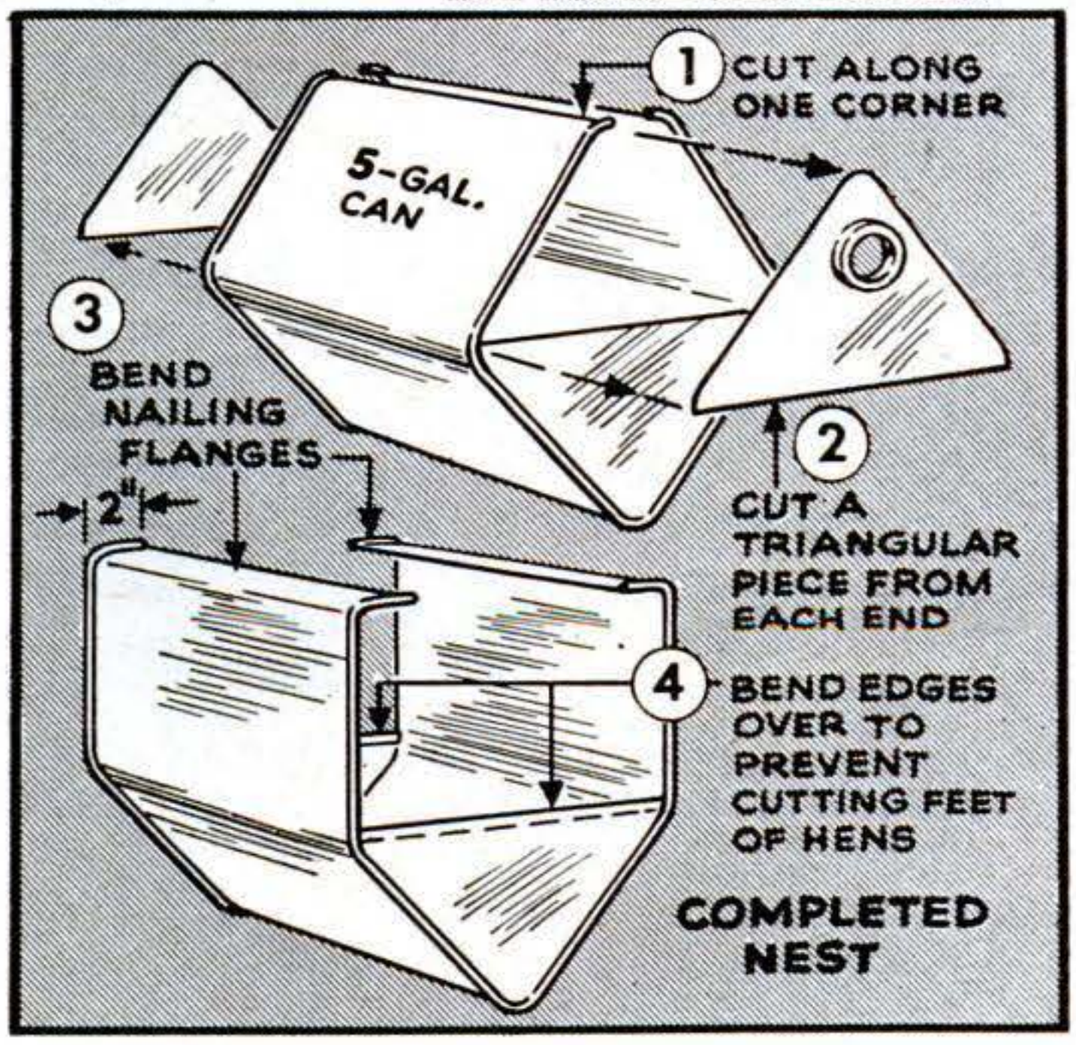
Copyrighted material

Laying Nests Made of Cans Are Easy to Clean



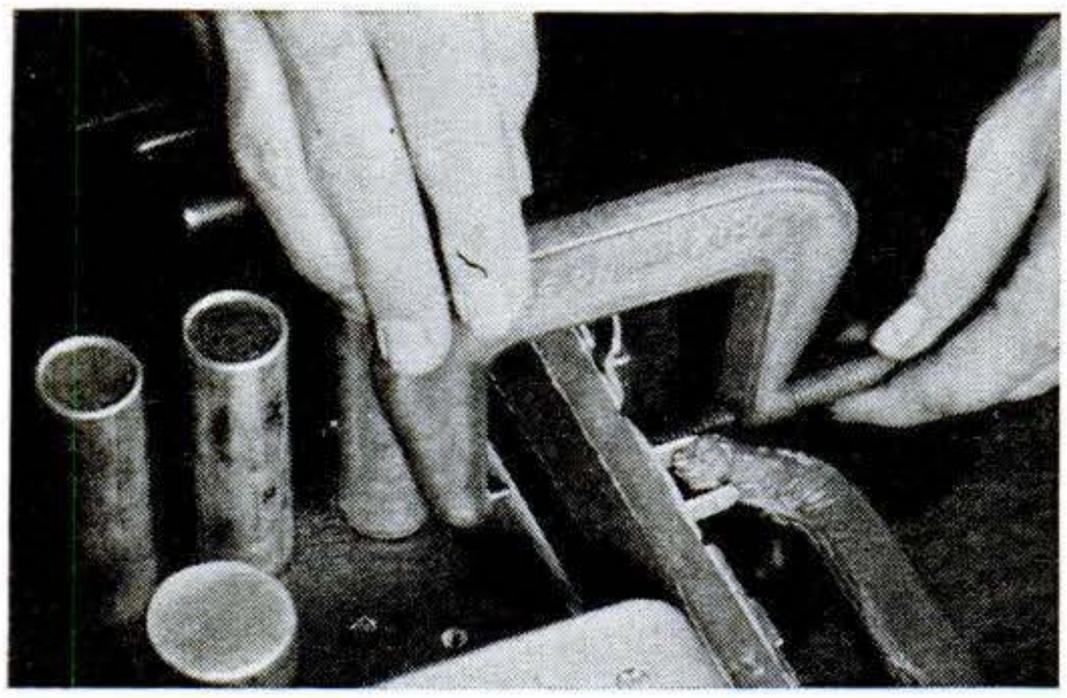
HENS favor these homemade laying nests over the flat-bottom kind in our laying house. The depth of the nesting straw and the sloping sides probably account for this.

To make them, first cut down along one corner of the 5-gal. cans. Next, cut out half the top with the filler spout along a diagonal as shown, and a similar piece out of the bottom. Fold over the cut edges. Bend a 2″ strip along each edge of the cut corner for a nailing flange. Then straighten the sides and nail the nest to a board as above. Provide a perch in front of the nests to invite your layers to do their stuff.—*E. L. Sadowski, Ashland, Ohio.*



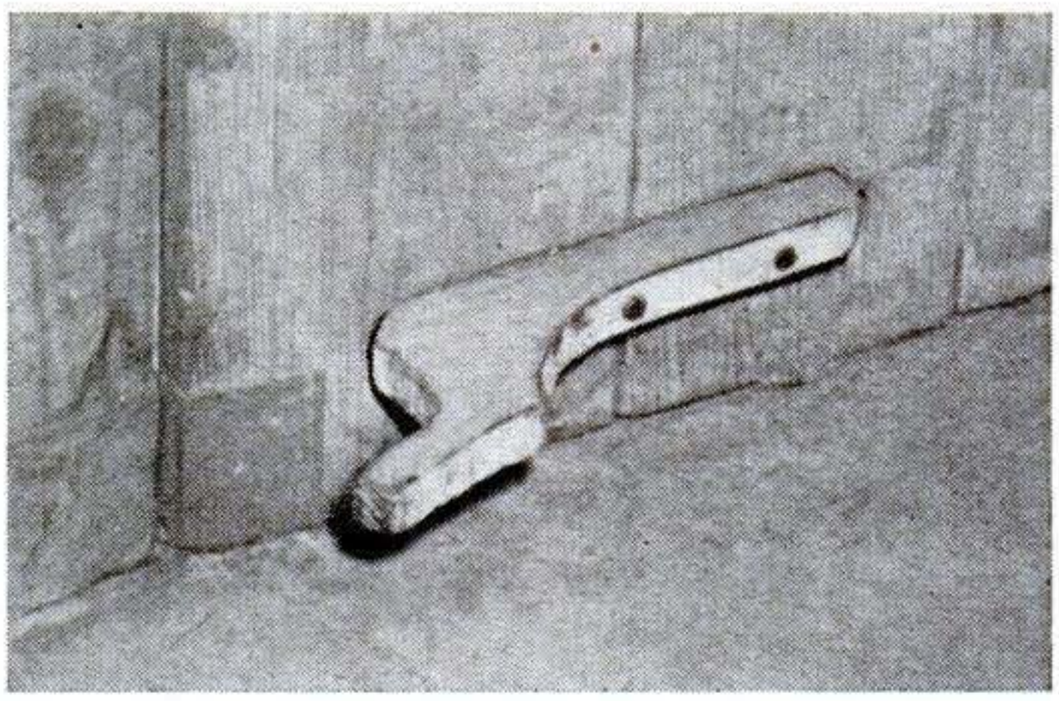
Roughing Smooth Concrete

SMOOTH sidewalks can be made less slippery by acid etching, which exposes some of the aggregate. The method, recommended by the Portland Cement Association, is to wet the surface and then to apply a 10-percent solution of muriatic acid. Let this stand until the surface is sufficiently etched. Rinse off thoroughly with water.



Starting Hard-to-Reach Screws

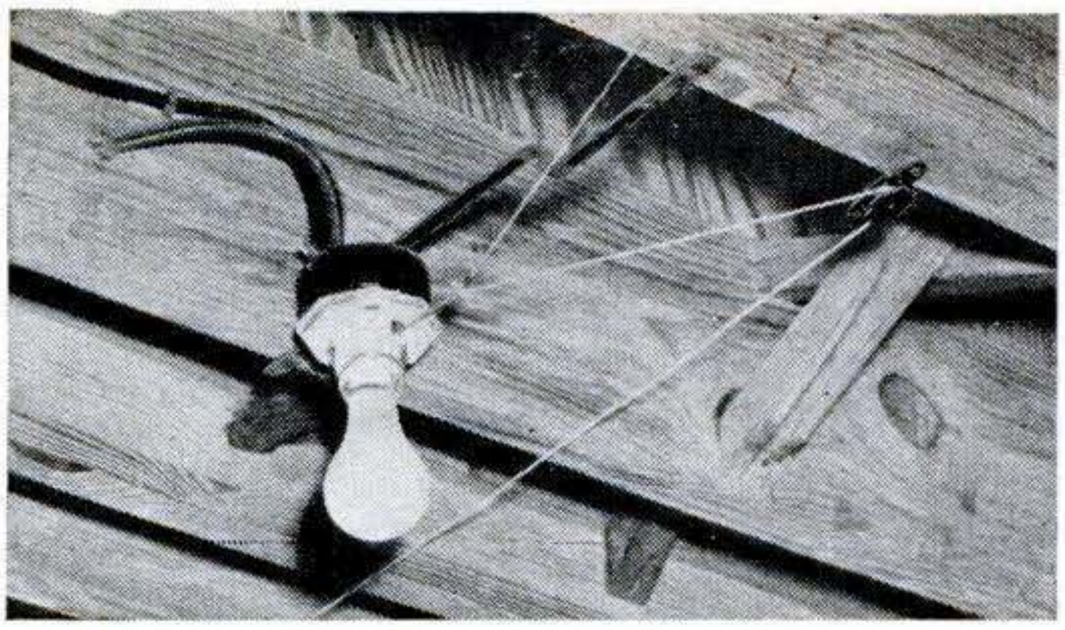
CLEATS had to be screwed on inside the carrying case to hold an amplifier. Hammering failed to start the wood screws. With no room to use a drill, they were pressed part way into the wooden wall with a C-clamp, and tightened with a screwdriver.



Cellar Door Opened by Foot

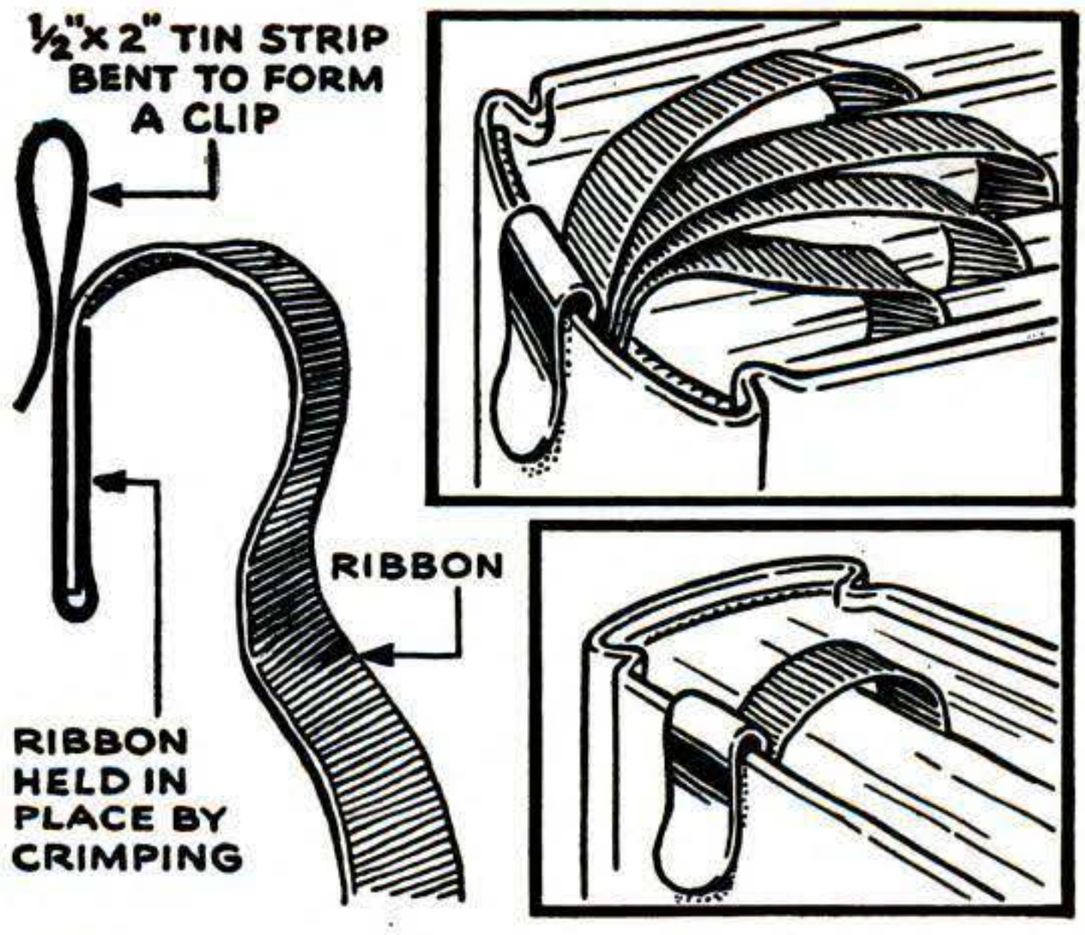
THE simple wooden bracket fastened to the bottom of this cellar door allows you to open it with a foot when both hands are full. A scrap of ¾″ plywood is the ideal material. Bandsaw the bracket to shape and attach it with two wood screws.

Copyrighted material



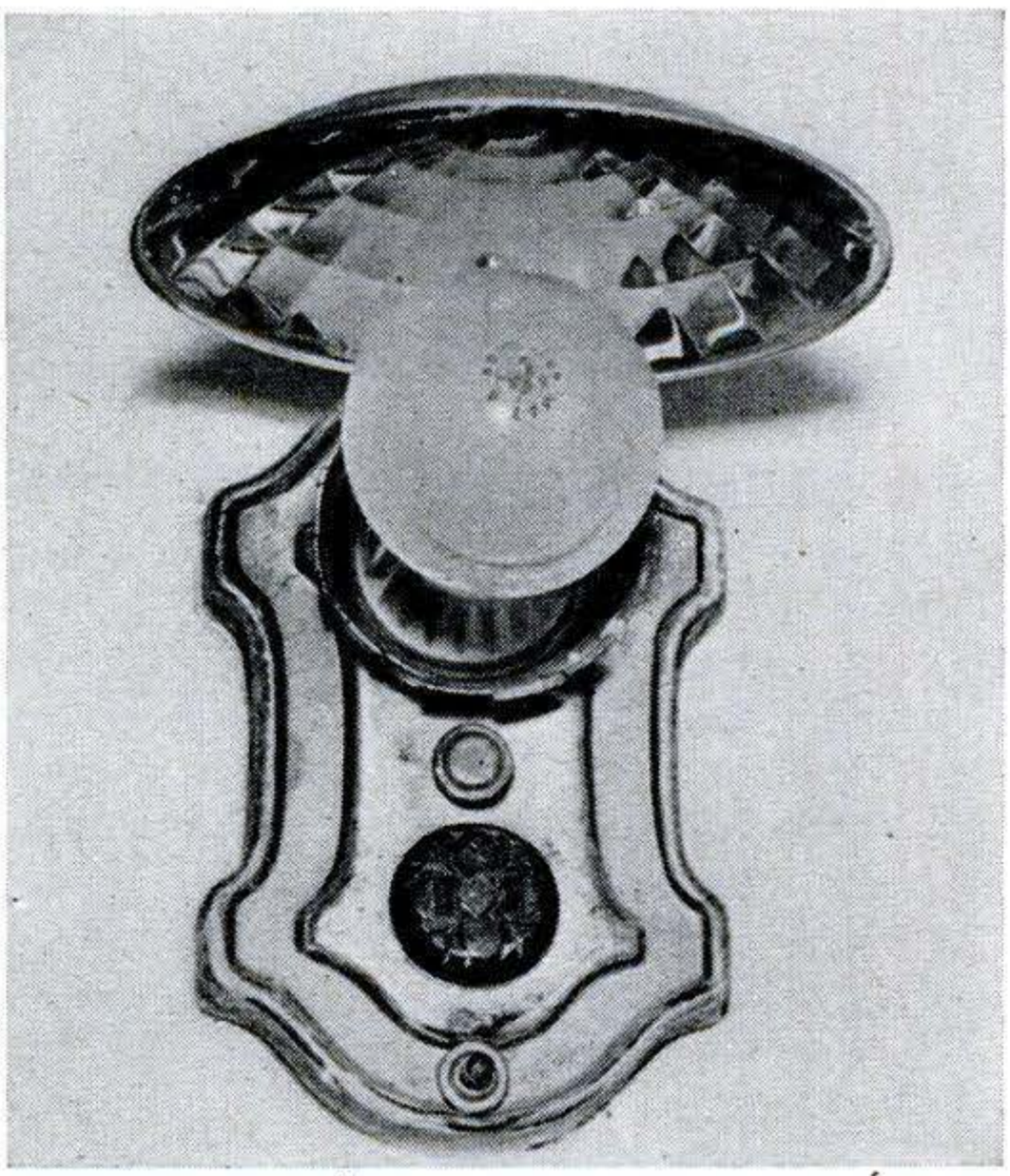
Pulley Reverses Switch Pull

RUNNING a cord from a light pull so that it can be operated at a distance or from two points is a familiar dodge. But the cellar light above was to be controlled from two opposite directions. One cord was therefore run directly to the spot. The other was carried over a small pulley and then back the other way. Although unnecessary in this case, a light spring can be hooked to this cord to keep it taut on the pulley.—*Glenn A. Wagner, Delmar, N. Y.*



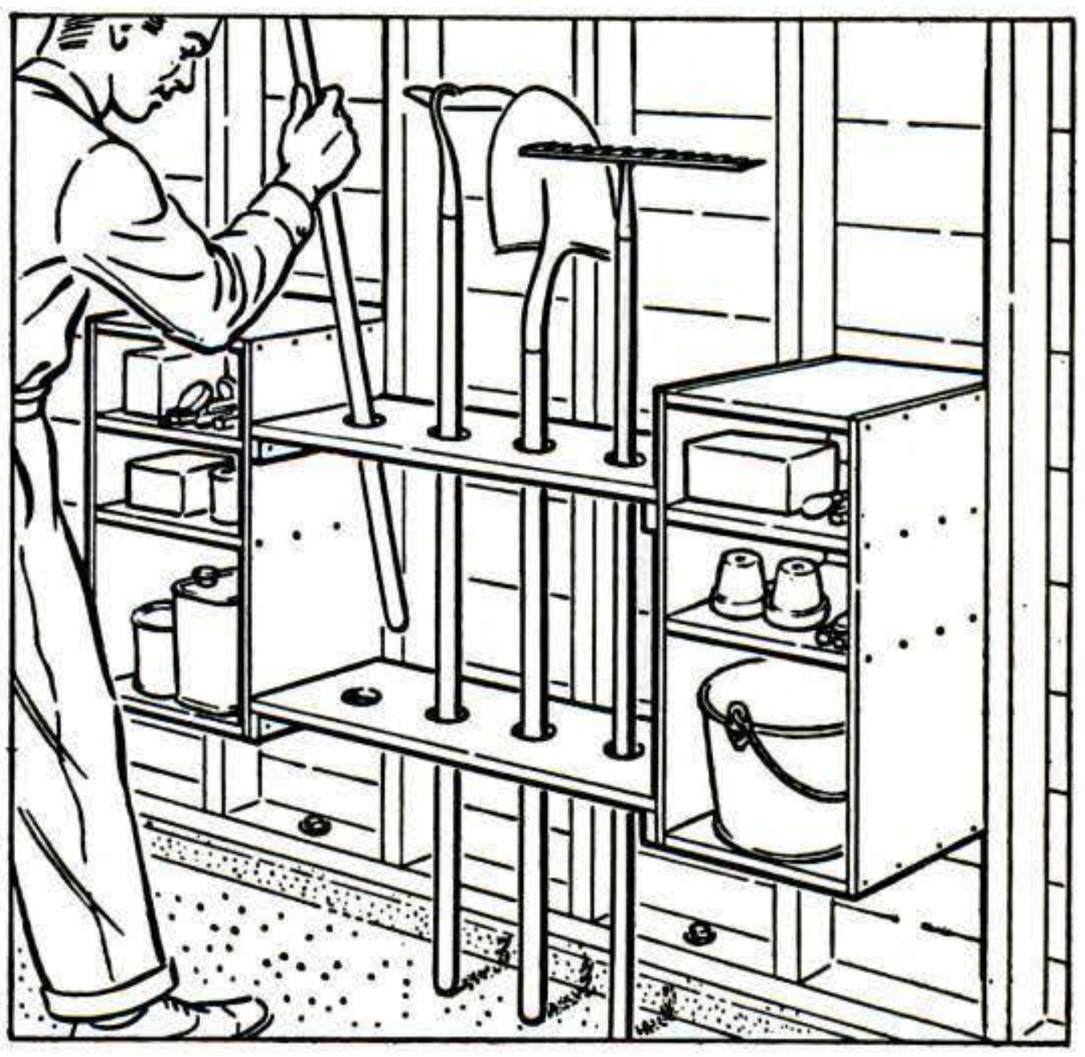
Handy Bookmark Cut from Tin

THIS page marker keeps several places and won't drop out. Bend a strip of tin-can metal as shown. Crimp one or more 6″ lengths of ribbon into the fold, using cement as well. Clip to the cover or back of the book.—*H. B. Crawford, Arvada, Wyo.*



Reflector Adds Shaving Light

A REFLECTOR of the kind used on photo flash guns gives extra shaving and makeup light from the type of bathroom fixture above. Slightly scratched reflectors can often be bought as "seconds" at a reduced price. The one shown was mounted by a short brass screw through its mounting bracket and one of the holes in the flange on the fixture that previously held the glass shade.—*D. J. Bachner, Jackson Heights, N. Y.*



Tool Rack Built in a Jiffy

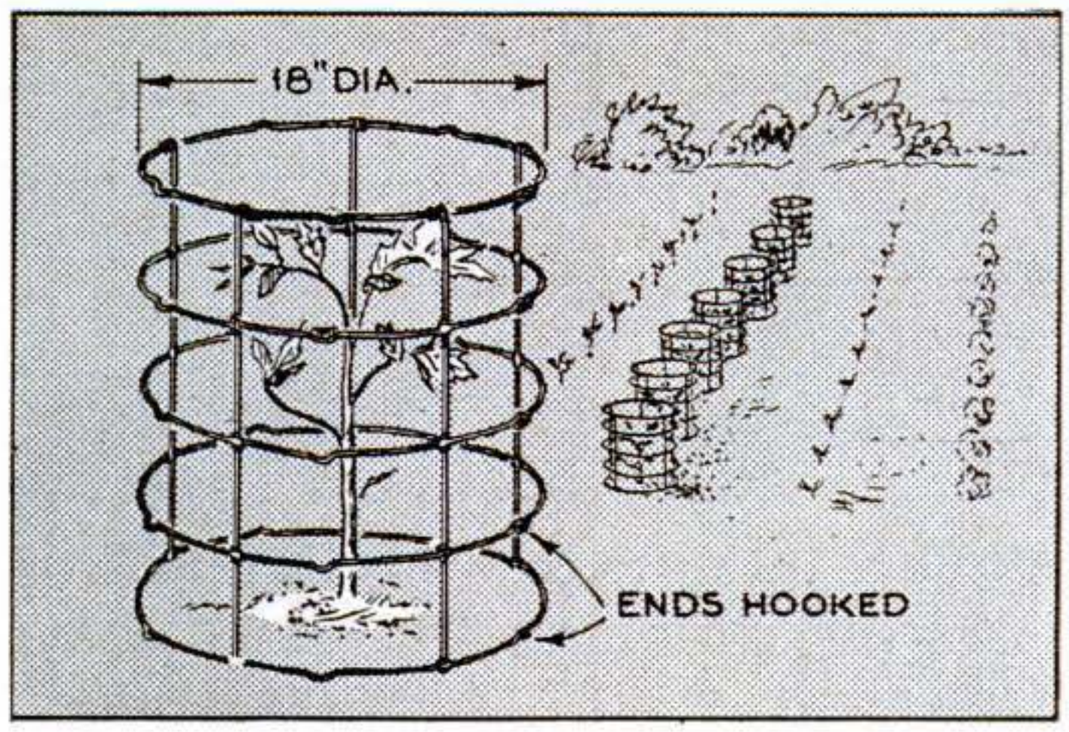
HERE'S an end to stepping on the rake in a dark shed or garage and having the handle remind you it's there the hard way. Two fruit boxes of the more substantial sort, with sides of ½″ stock, and a couple of short boards will make a sturdy wall tool rack. Nail cleats to one side of each box, and nail the boxes between two joists a convenient distance apart. Cut two boards to fit, bore holes for the tool handles, and nail the boards to the cleats. Extra shelves may be put in for trowels, flowerpots, seeds, and so on.—*Marion L. Rhodes, Knightstown, Ind.*

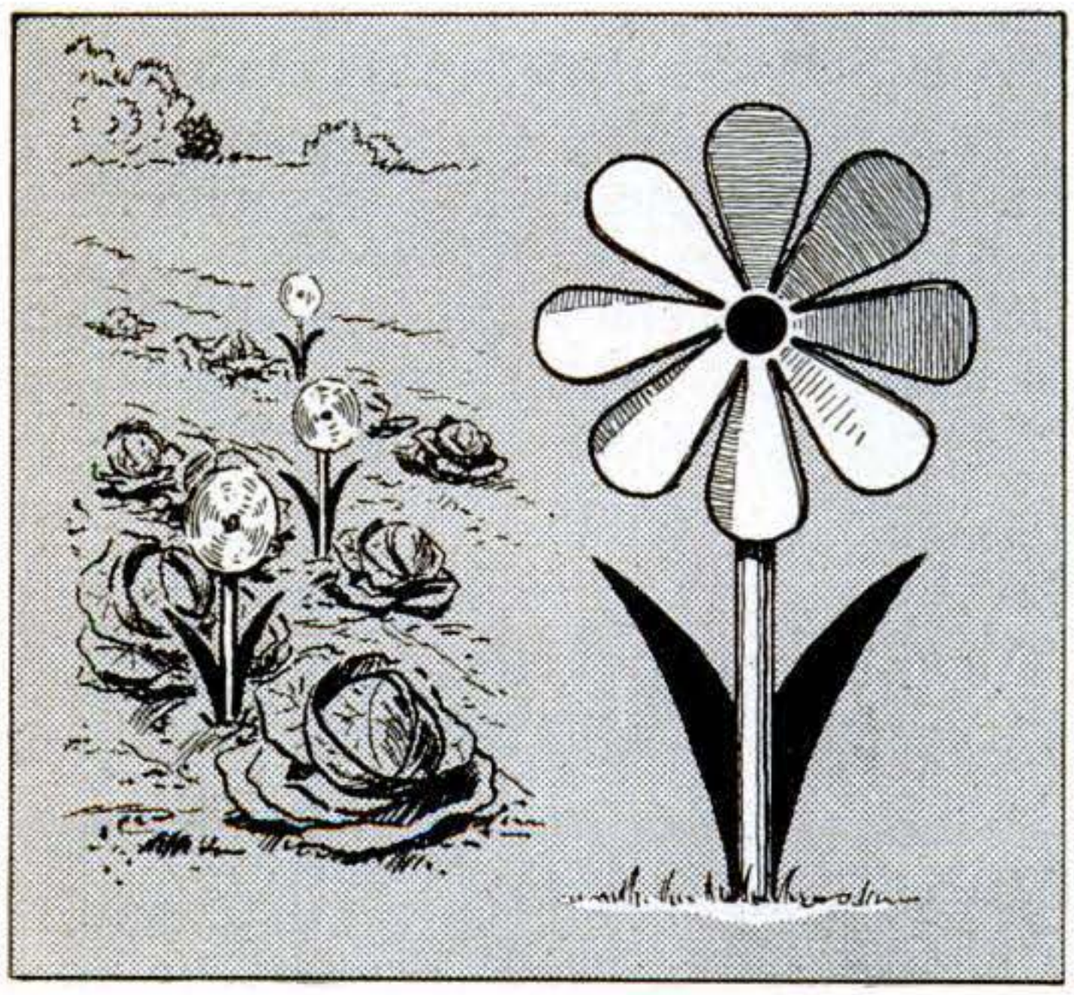
Copyrighted material

Wire Racks Keep Tomato Plants Off the Ground

HERE'S an effective way of supporting tomato plants. From wire fencing 26″ or 32″ high, form cylindrical racks about 18″ in diameter and set a rack over each plant while it's still small.

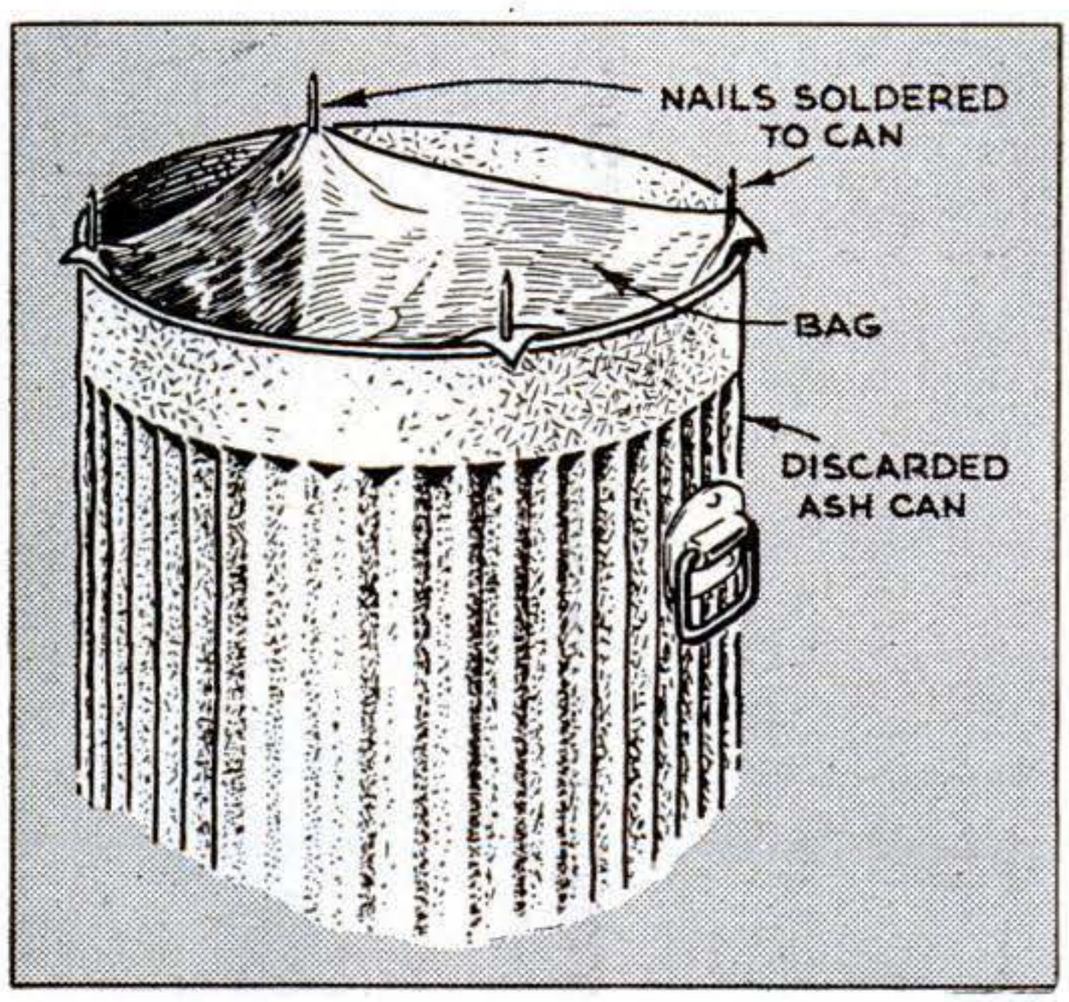
Racks are easily made by bending wire fencing in a circle and hooking the ends together. Press and turn the rack to imbed the bottom firmly in the earth. A standard 20-rod roll of fencing will provide about 66 racks. They may be stored and used from year to year.—*H. B. Agnor, Lexington, Va.*





Windmills Scare Away Rabbits

GARDEN plants frequently suffer from rabbit intruders. You can frighten them away by setting up toy windmills among the plants. Make the windmills from tin-can stock in the shape of flowers and paint them bright colors. These are both effective and attractive.—*Margaret M. Bailey, Quincy, Ill*



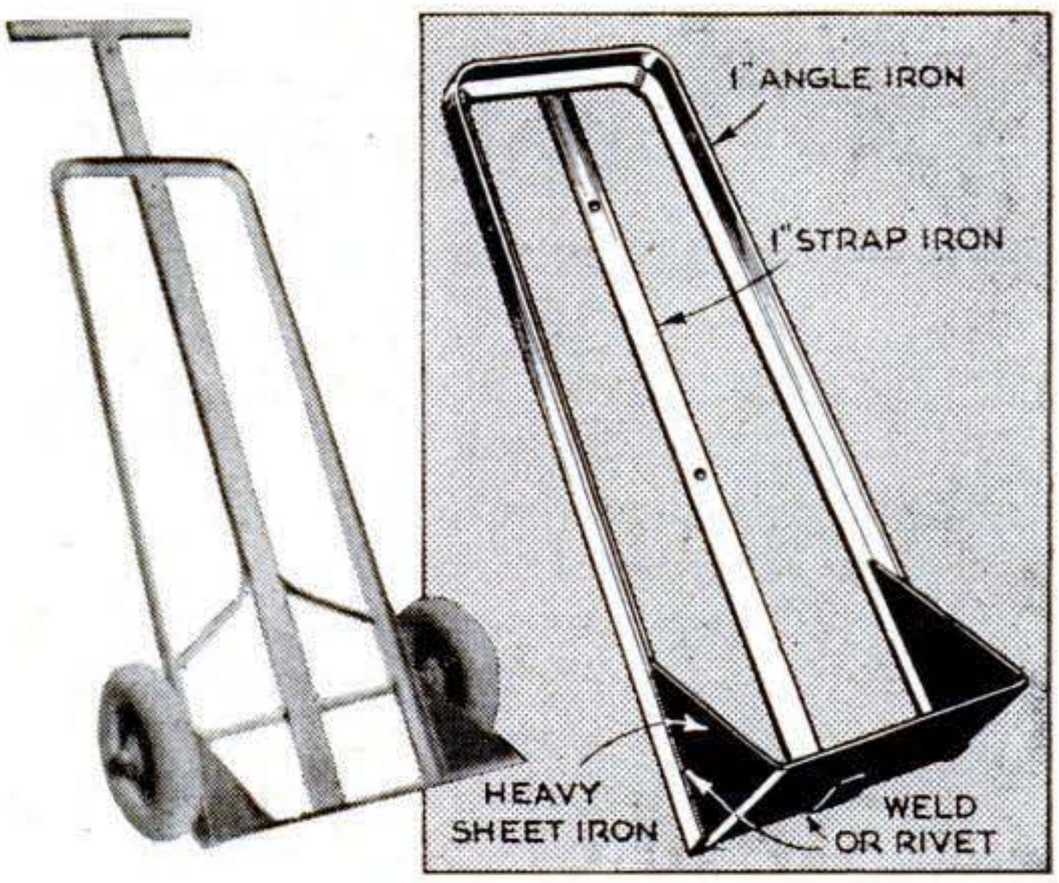
Can Supports Bags for Filling

IF YOU are looking for a way of holding cloth or burlap bags while they're being filled, an old ash can will do the trick nicely. Just solder three or four nails around the lip of the can and hook the edges of the bag over these. It may help to file the nails sharp. —*Victor H. Lamoy, Upper Jay, N. Y.*

Iron Frame Turns Discarded Lawn Mower into Dolly

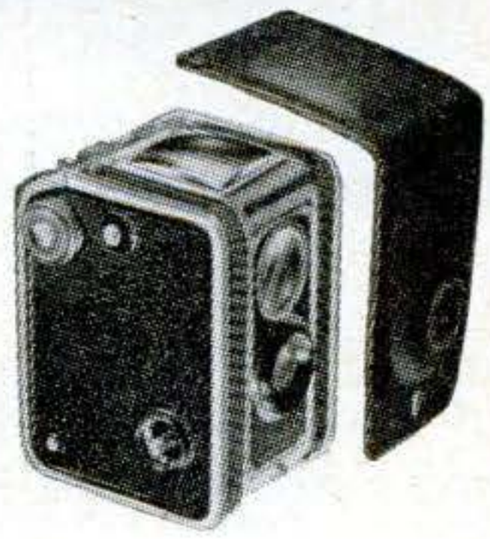
A LAWN MOWER doesn't have to cut grass to be useful. Even one that has seen better days can do a good job of transporting heavy or bulky items. Simply remove the cutter-bar assembly and bolt on an iron frame such as that shown at the right.

Though welded construction is shown, either rivets or nuts and bolts can be used to hold the pieces of angle, strap, and sheet iron together. The angle iron makes the frame strong and rigid without being too heavy.—*John Krill, No. Lima, Ohio.*



Copyrighted material

. . . and it's only $11.75—plus tax



Camera comes complete with protective shield

Large Reflex View Finder

Shows big, brilliant image. You see what you're getting *before* you snap the shutter.

So Simple to Use

The Kodet lens is fixed-focus—no adjustments necessary. The shutter is ready-set—just press the button.

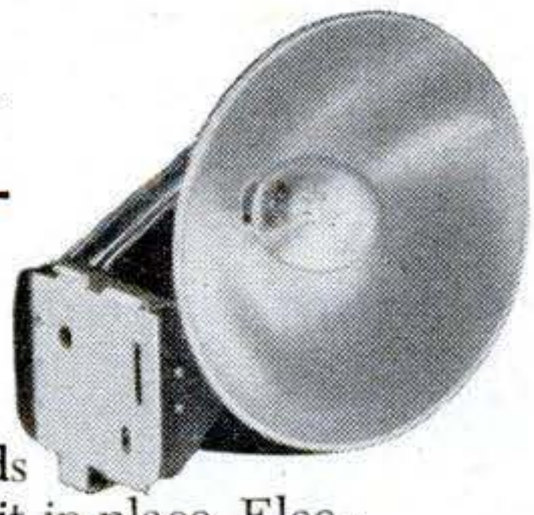
Big Print Size

Snapshots as big as with the most expensive reflex camera. Black-and-white prints 2¼ x 2¼; Kodacolor Prints 2⅞ x 2⅞ inches.

Pictures round the clock

Brilliant outdoor shots—and, with Kodak Duaflex Flasholder, indoors as well . . . day or night . . . in color or black-and-white.

KODAK DUAFLEX FLASHOLDER—$2.50 (plus tax)—



is the only accessory needed for flash pictures. It quickly attaches to camera. Two studs and slide lock hold it in place. Electrical contacts built into camera and Flasholder give direct connection between battery and shutter mechanism.

KODAK CLOSE-UP ATTACHMENT 6A—$1.20 (plus tax)—

slips over the taking lens . . . equips your Kodak Duaflex Camera for a new range of pictures . . . allows you to take head-and-shoulder shots, close-ups of flowers, etc. Focus with attachment is from 3 feet to 4½ feet.

"Kodak" is a trade-mark

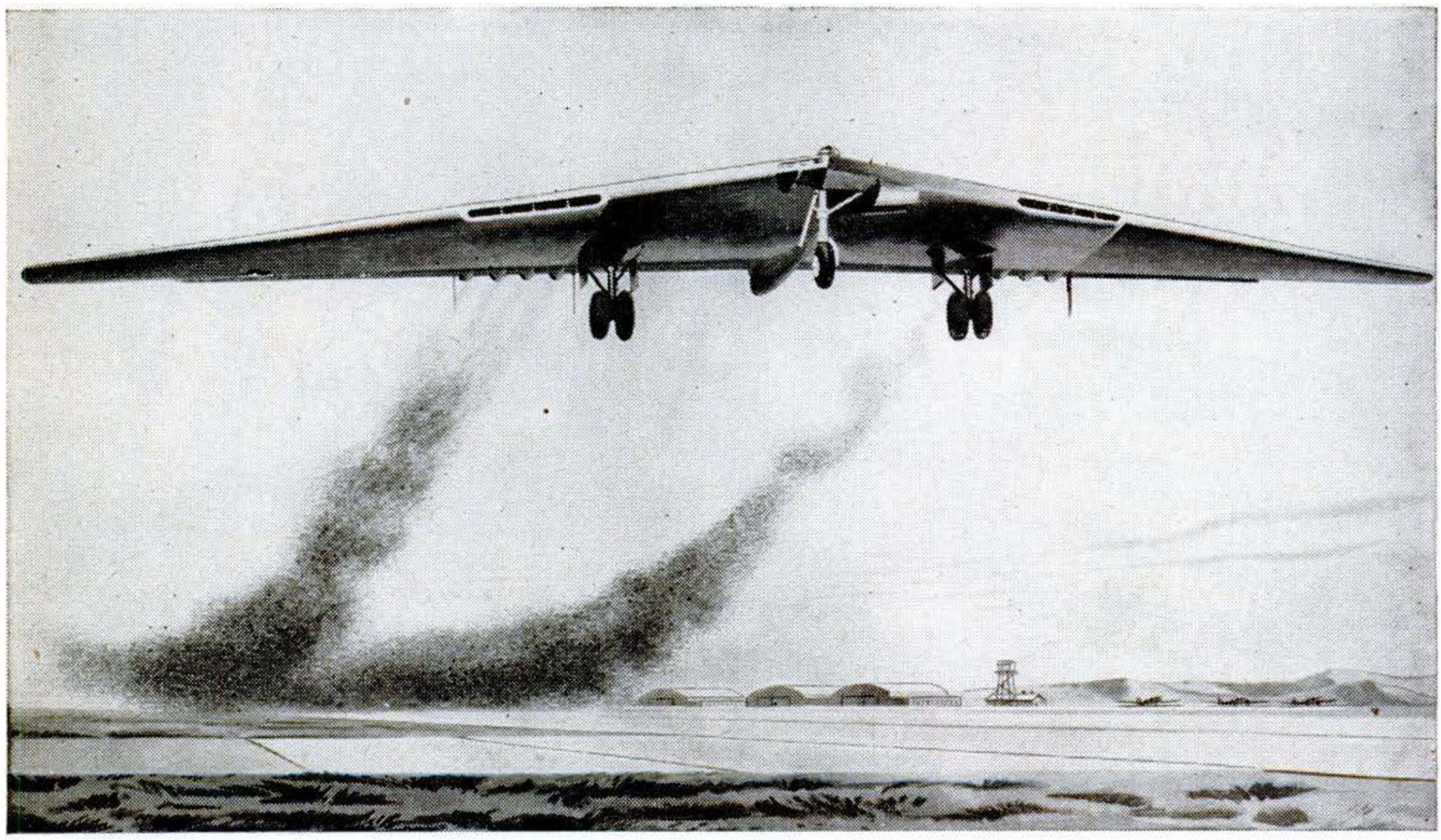
(Prices subject to change without notice)

Kodak

EASTMAN KODAK CO., ROCHESTER 4, N. Y.

Copyrighted material

BOMBS GO ON A BAT!



THIS big, bat-like flying wing is the YB-49. All by itself it could conduct a bombing raid undreamed of a few years ago.

It is designed to lift ten thousand pounds of bombs into the air, fly five thousand miles to its target, drop its bombs and fly all the way back to its home base.

It measures 172 feet from wing-tip to wing-tip. It is powered by eight giant jet engines. And it can fly so fast that only the fastest jet fighter planes could catch up with it.

This is an all-metal hint of some of the great things coming in the future of aviation. It is a working model of the research being conducted for the U. S. Air Force for the security of the United States.

The U. S. Air Force needs young men who have the inner urge to keep pace with the progress of aviation. It needs specialists in all phases of aviation. In turn, it will give them a background of aviation education that can't be had anywhere else in the world today.

There's an opening for every physically and mentally fit young man in the United States in the U. S. Air Force. Get the details of the many opportunities open to you at your U. S. Army and U. S. Air Force Recruiting Station.

U. S. ARMY AND U. S. AIR FORCE RECRUITING SERVICE

CAREERS WITH A FUTURE

U. S. Army and U. S. Air Force

Copyrighted material

Exclusive Du Pont Formula Speeds Car Polishing

...GIVES A BRILLIANT LUSTRE!

A small section of the surface of an average car magnified 20 times. The left side is shown still covered with Traffic Film. The right side has been cleaned with Du Pont NO. 7 POLISH.

DU PONT №7 POLISH

Contains "stroke saving" methyl cellulose

Car polishing doesn't have to take all day. You can do the job quickly and easily with NO. 7 POLISH. It is made by a patented, exclusive Du Pont formula . . . removes dirt and grime quickly, without tedious scrubbing. And it cleans up *fast*, leaving a dry, brilliant shine. Use NO. 7 POLISH as a short-cut to that "showroom shine"!

DU PONT
REG. U.S. PAT. OFF.

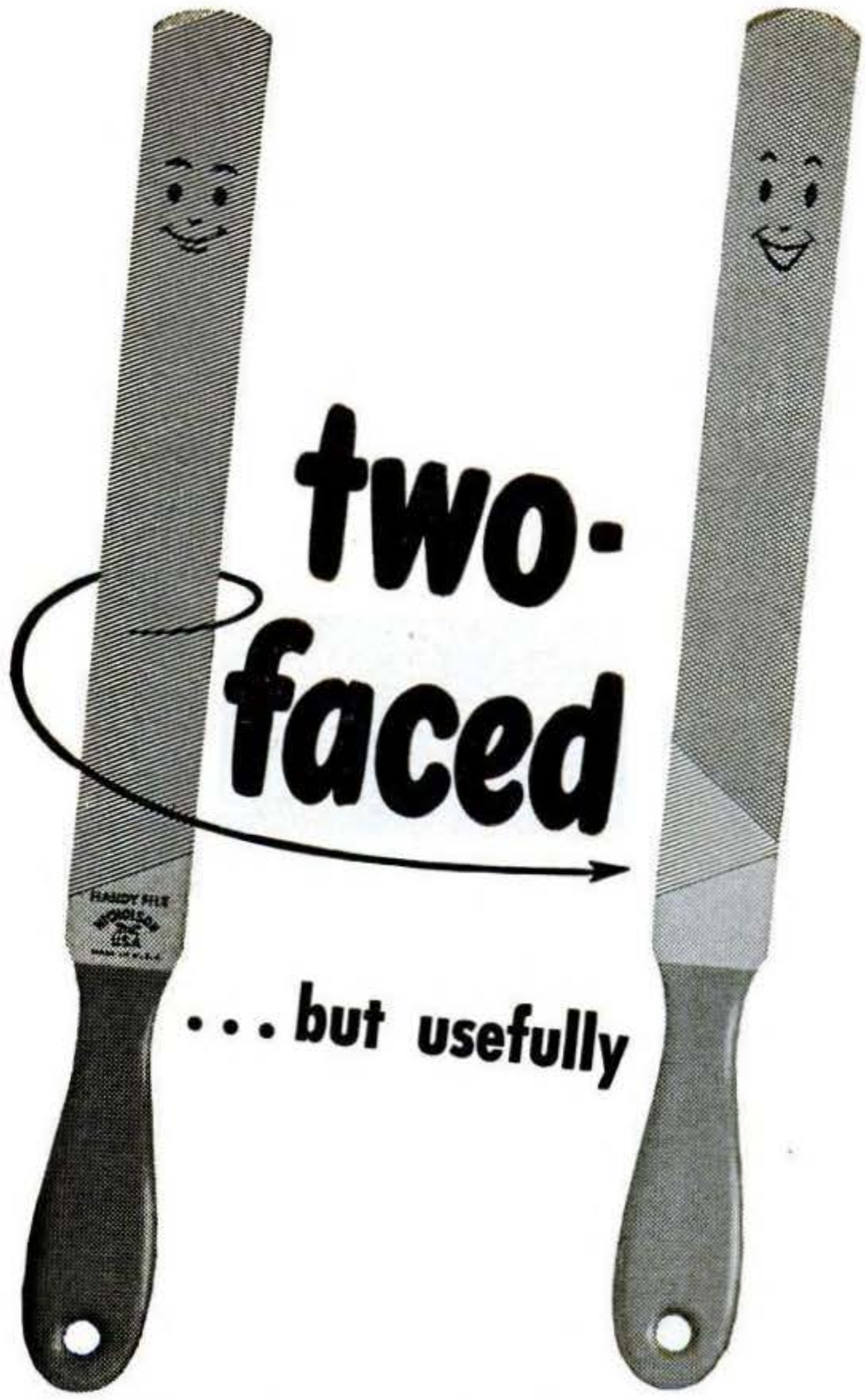
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

Attention... NEW CAR OWNERS!

Here's a wax-polish made especially for *new* cars—and others whose finish is in first-class condition. It cleans and wax-polishes in one easy operation. Gives a brilliant lustre. Keeps cars looking new.

DU PONT SPEEDY WAX

Copyrighted material



IT'S BACK!—the Handy File which won the favor of tens of thousands of users before the war temporarily halted its manufacture. Now again craftsmen and home owners can enjoy the convenience and economy of its features, which include two kinds of cutting surfaces:

Single cut teeth on one side, for sharpening edged tools and smooth finishing in general. ***Double cut*** teeth on the other side, for fast stock removal.

In addition, the Handy File has one cutting and one "safe" uncut edge. Flat, orange-colored handle makes the Handy File easy to carry (no bulge—slips conveniently into hip or leg pocket). Also has convenient hang-up hole.

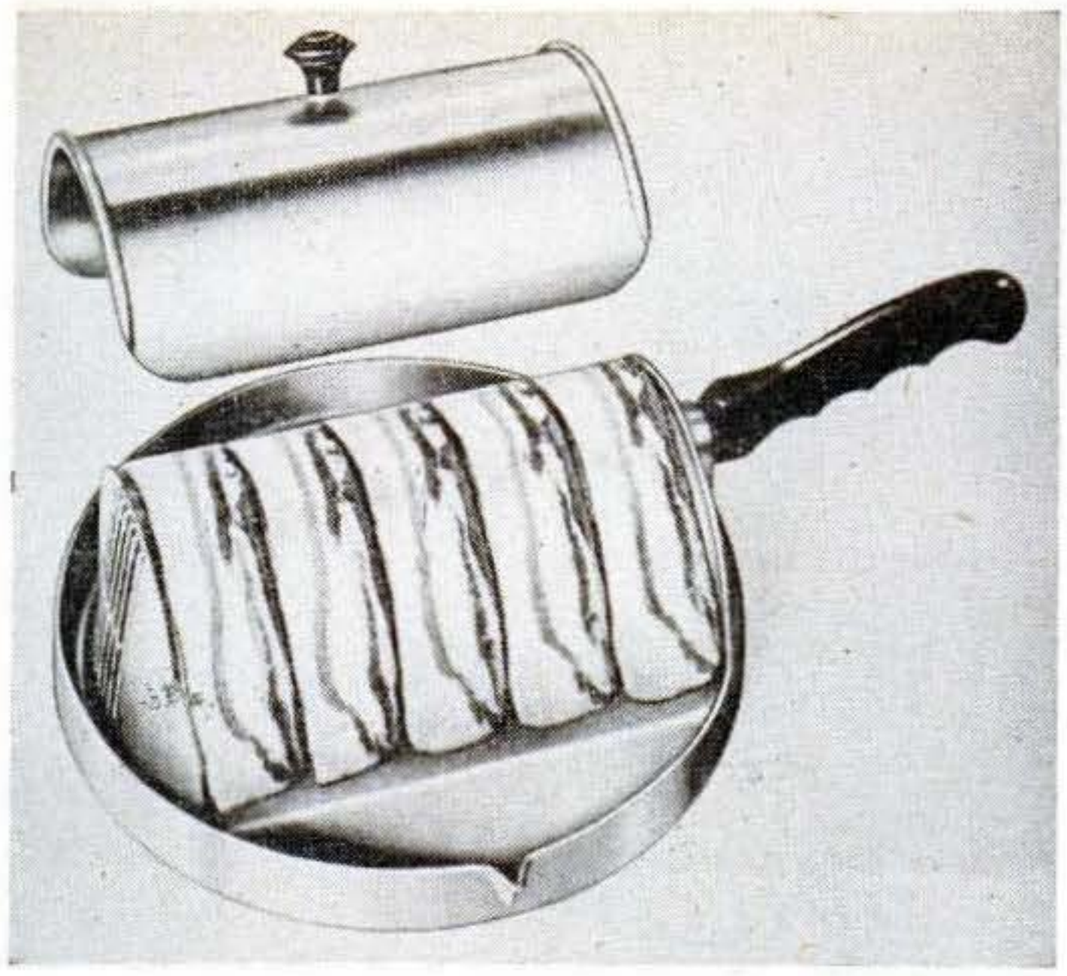
The Handy File (in either Nicholson or Black Diamond brand) is virtually two files in one. Get it at your hardware dealer's. Each Handy File is cellophane wrapped, to bring it to you fresh and free from rust.

NICHOLSON U.S.A.

NICHOLSON FILE CO.
19 Acorn St.
Providence 1, R. I.
(In Canada, Port Hope, Ont.)

BLACK DIAMOND TRADE MARK

NICHOLSON FILES *FOR EVERY PURPOSE*



Cooks Better Bacon

IF YOU like your breakfast bacon crisp and greaseless, this new griddle does the trick to a turn. Grease drips down the slanting sides, so no drying is necessary. The strips come out flat, with a minimum of shrinkage. Distributed by Allegretti & Co., of Los Angeles, the El Ranchero Ⓣ griddle is made of die-cast aluminum, and can be used for cooking other meats as well.

Handy Telephone Aid

NO MORE "wait till I get a pencil and paper" with this new Tel-Sec Ⓣ as a part of your telephone. As shown above, an ordinary scratch pad and a pencil are contained in a metal pull-out slide that remains rigid when extended. Made by Lanko Industries, of Detroit, Mich., the Tel-Sec comes in two types, one fitting under the oval-base telephone; the other (illustrated) for use with the newer square-base instrument.

Copyrighted material

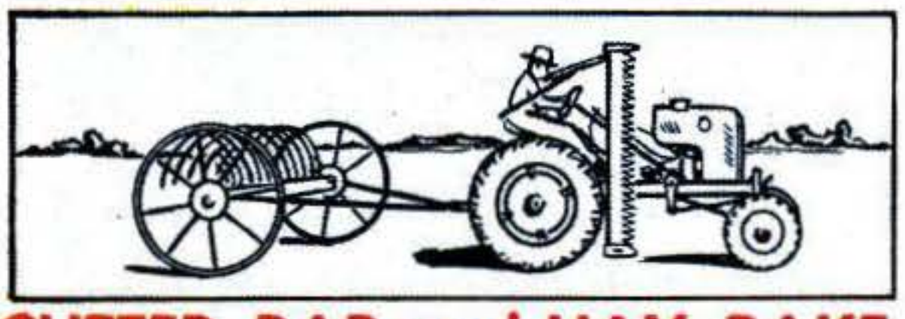
SAVE TIME AND WORK—MAKE MONEY with

SHAW "DU-ALL" and "PEPPY-PAL" TRACTORS

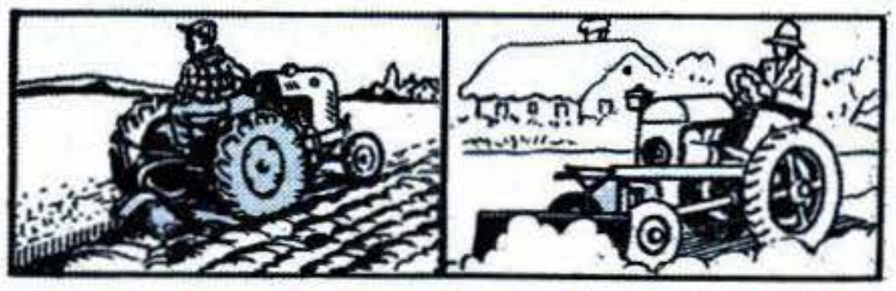
RIDING and WALKING MODELS—1½ to 12½ H.P.

Backed by
45 YEARS
OF MANUFACTURING
"KNOW-HOW"

PROMPT SHIPMENT



CUTTER BAR and HAY RAKE



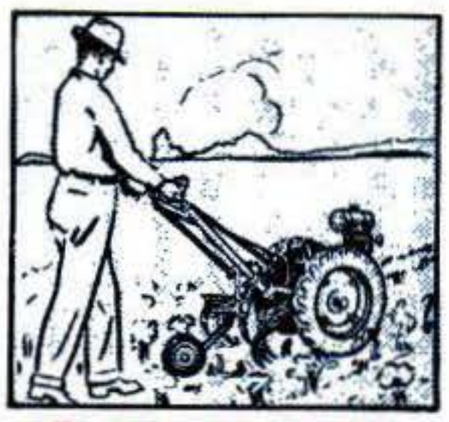
WORKS WINTER and SUMMER

Shaw tractors are the result of more than 45 years' experience in building tractors and other farm equipment. They're built by men who have the "know-how" of both farming and mechanics. That's why every Shaw tractor carries a full year's guarantee protecting you against any defect in workmanship or material.

DEALER TERRITORIES OPEN

There are still some good, profitable territories open for aggressive retail dealers. Write for information.

PLOWS



CULTIVATES

Dozens of Jobs Done Quickly and Easily

Do all kinds of hard jobs the easy way with Shaw Du-All or Peppy-Pal tractors . . . jobs that produce more food and feed, in less time with less work . . . at less cost. You can plow, cultivate, mow, harrow, disk, spray, grind, bulldoze, plow snow, saw wood and do many kinds of belt jobs, dig, haul, seed and scores of other jobs with these sturdy, powerful tractors.

Their extra-strength construction, precision engineering and efficient power utilization mean top performance on the most rugged job.

IDEAL FOR GARDENS, SMALL FARMS

Shaw walking and riding tractors are dependable, all-around economical workers . . . ideal for truck farms, gardens, orchards, nurseries, poultry farms, golf courses, estates, and cemeteries. They're always ready, always willing . . . a size to fit your needs. Hand or electric starter on riding models; 24 inch plant clearance.

Many outstanding features make Shaw tractors easy to operate -- women and children enjoy running them. Equipment is easily attached with the "Jiffy Hitch," handles are adjustable. Models with variable speeds — forward and reverse. Also power turn.

SOON PAYS FOR ITSELF

Shaw tractors save so much time and labor and get so much work done, at such low cost, they pay for themselves quickly and many times over. Hundreds of operators use Shaw tractors to earn spare-time money.

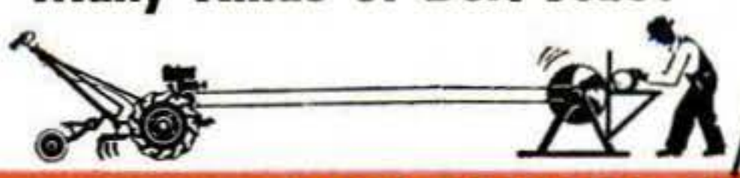
CHEAP TO OPERATE

Just a few cents an hour will operate your Shaw tractor. They're strong, rugged, well-built . . . give you years of good service with very low maintenance expense. The initial cost is amazingly low . . . write today for full information and price lists.

HARROWS

MOWS

SAWS WOOD — Does Many Kinds of Belt Jobs!



SHAW "DU-ALL" and "PEPPY-PAL" TRACTORS

ACT NOW!

TOP QUALITY MATERIALS

Built almost entirely of steel, arc-welded and consisting of thoroughly field-tested parts, Shaw tractors are famous for their dependability, utility and low upkeep. You can buy them with complete confidence.

LOW FACTORY PRICES

A modern factory and streamlined production methods assure you substantial savings. Shaw Du-All and Peppy-Pal tractors are available through dealers or direct from the factory. Mail the coupon for full information and special price list.

FREE FOLDER and Price List! MAIL COUPON TODAY!

Send no money MAIL COUPON FOR PRICE LIST AND FREE FOLDER

SHAW MANUFACTURING CO.
5705 Front Street, Galesburg, Kansas or
668-PS North 4th Street, Columbus, Ohio

Please send me Free Folder and price list.

Name_____

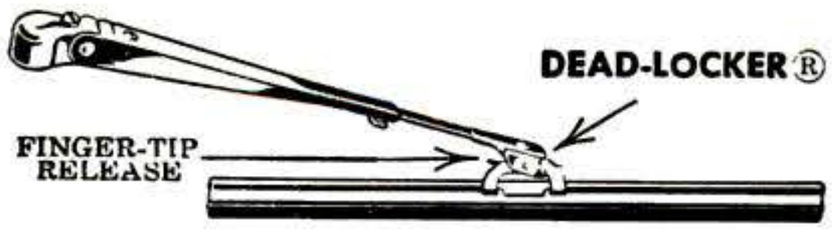
Address_____

Copyrighted material

ANCO® RAIN-MASTER®

WINDSHIELD WIPER BLADES and ARMS

Blade snaps on—Stays put
Can't fall off—Can't blow off



Don't Blame Your Gas-Pump Man!

Sure, he knows how dangerous it is for you to drive your car . . . in stormy weather . . . with dull old windshield wipers that *smear* and *SMEAR!*

He'll gladly put on for you—quickly—a pair of keen new ANCO RAIN-MASTER Blades—or Blades and Arms.

HE NEGLECTS YOU?

He has RAIN-MASTERS . . . But he forgets to remind you? Too busy?

After all it's *YOUR* car to protect. ...So, *YOU* ask *HIM* for RAIN-MASTERS next time you buy gas....Patented features....Original equipment on DeLuxe Models of high-grade cars . . . because RAIN-MASTERS *Clean quicker—Clean cleaner—Last longer.*

Get yours—next time you buy gas. May save you a costly smashup!

Made by ANCO . . . makers of the new CLEAR-FLEX* Wiper Blade—the only Blade worth more than RAIN-MASTER. Costs more. Ask your good ANCO dealer to show you why.

*Trade Mark

Quality Protected Under Fair Trade Laws
ANCO Patented Products—Patents Make Jobs

THE ANDERSON COMPANY
Established 1918
GARY, INDIANA

NOW—For the First Time a
SCREW-STEM FILTER PIPE for $1

Royalton FILTERWELL
With *Ajustomatic* Stem

Never before a screwstem pipe with all these features: patented free-turning self-aligning *Ajustomatic* stem—an easy-to-replace Filter—choice of smart styles in fine imported briar—and a low, low price making it the *best buy in pipe history!* At Better Stores . . . .

$1

HENRY LEONARD & THOMAS, INC. OZONE PARK 17, N. Y.

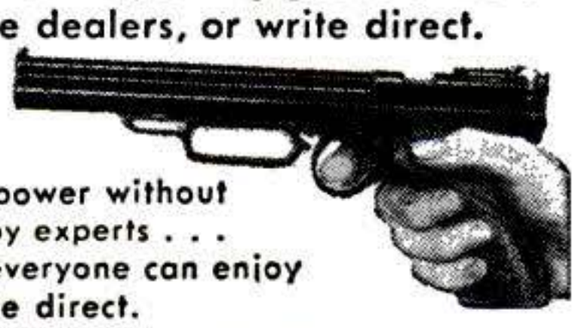
GET MORE FUN for LESS MONEY with a CROSMAN!

ADJUSTABLE POWER *without powder* means you can shoot your Crosman indoors with safety and accuracy, without recoil, noise or odor. It means keen sport outdoors, too . . . target shooting, small game. Ammunition (Super-Pells) less than 1/3 cent a shot.

Crosman *Silent* RIFLE

. . . is available in single-shot or magazine types, .177 or .22 cal. A man's size, fine quality gun, with perfect balance, rifled barrel, rear peep and blade front sights. At sporting goods or hardware dealers, or write direct.

Crosman "Bullseye"



is a new .177 cal. single-shot target pistol with all Crosman "power without powder" advantages. Endorsed by experts . . . inexpensive to own and shoot—everyone can enjoy it. At your dealer's . . . or write direct.

CROSMAN ARMS CO., INC.
9 HENRIETTA ST. • ROCHESTER 7, N. Y.

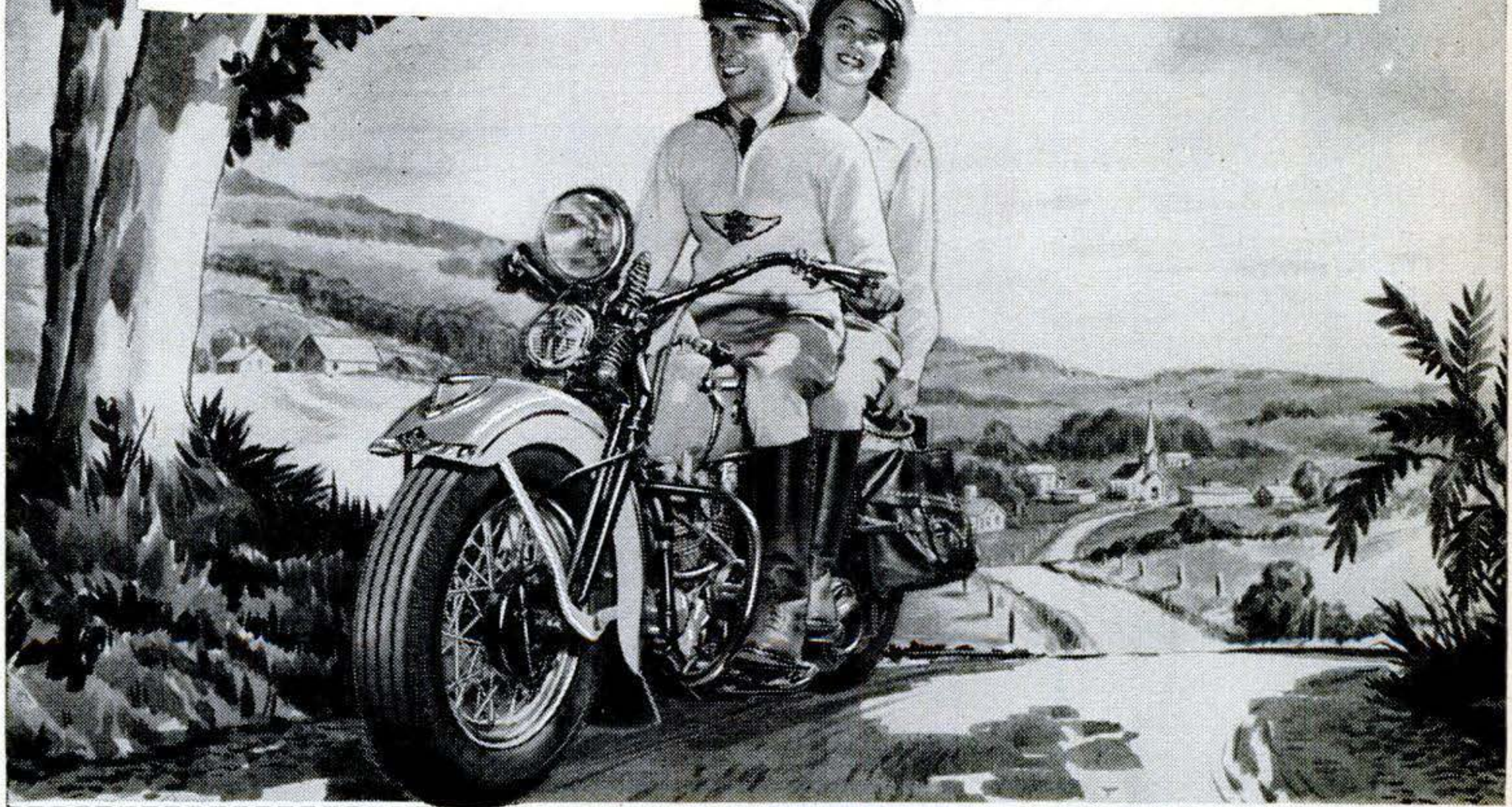
Copyrighted material

fun thrills excitement

when you own a

HARLEY-DAVIDSON

Like to roam? Does a winding road fascinate you with its alluring promise of something new around every bend? Do you enjoy country air, the fragrance of fields, meadows, woodlands? Do tumbling waterfalls, quiet lakes, broad rivers bring you back to them again and again? Then you'll like motorcycling, world's greatest sport! For it takes you places, out in the open, to scenic wonderlands, faraway cities, brings you the thrills of gypsy tours, race meets, hillclimbs, exciting vacations . . . makes every spare hour mean happier, healthier outdoor enjoyment. It's so easy to enjoy motorcycling, easier than you think to own a genuine Harley-Davidson. Why not get started now? See your dealer. Mail coupon today.



HARLEY-DAVIDSON MOTOR CO.
Dept. PS, Milwaukee 1, Wis.

Send free copy of ENTHUSIAST magazine, filled with motorcycle action pictures and stories; also literature on 1948 models.

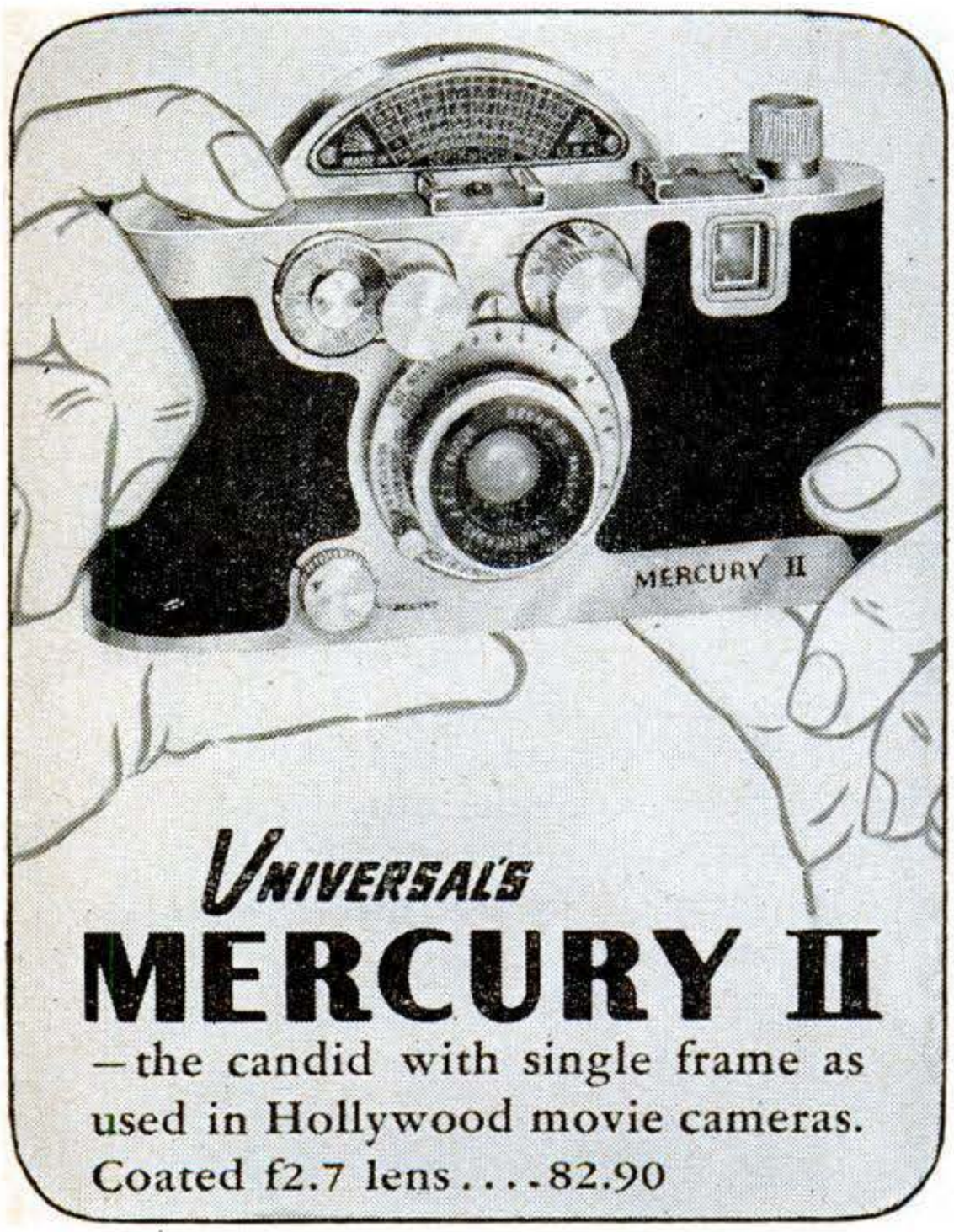
Name.....

Street or R.F.D.....

City.....Zone.....State.....

Copyrighted material

COLOR FANS
say it's terrific

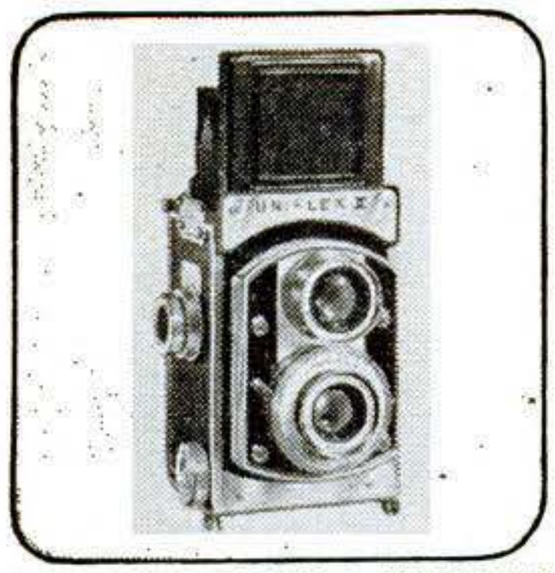


THE best color shots I've ever seen." . . . "Nothing can touch it for color . . . even the background is crisp and sharp." . . . "The best color camera, American or foreign, that I've used, regardless of price."

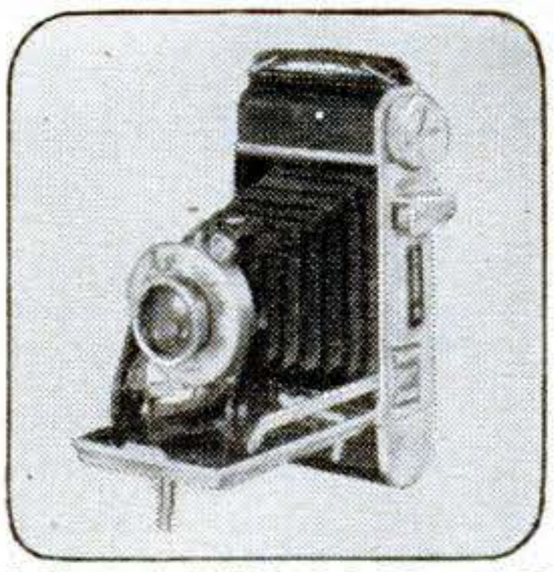
When experts . . . camera fans who have tried them all . . . write such glowing tributes to Universal's Mercury II, it must have something special!

It has! It has single frame design, the same miracle single frame that all Hollywood movie cameras use. Result: the lens is 30% closer to the film; depth of focus is unparalleled; you don't even need a range finder. At all reliable dealers.

UNIVERSAL CAMERA CORPORATION
New York, Chicago, Hollywood

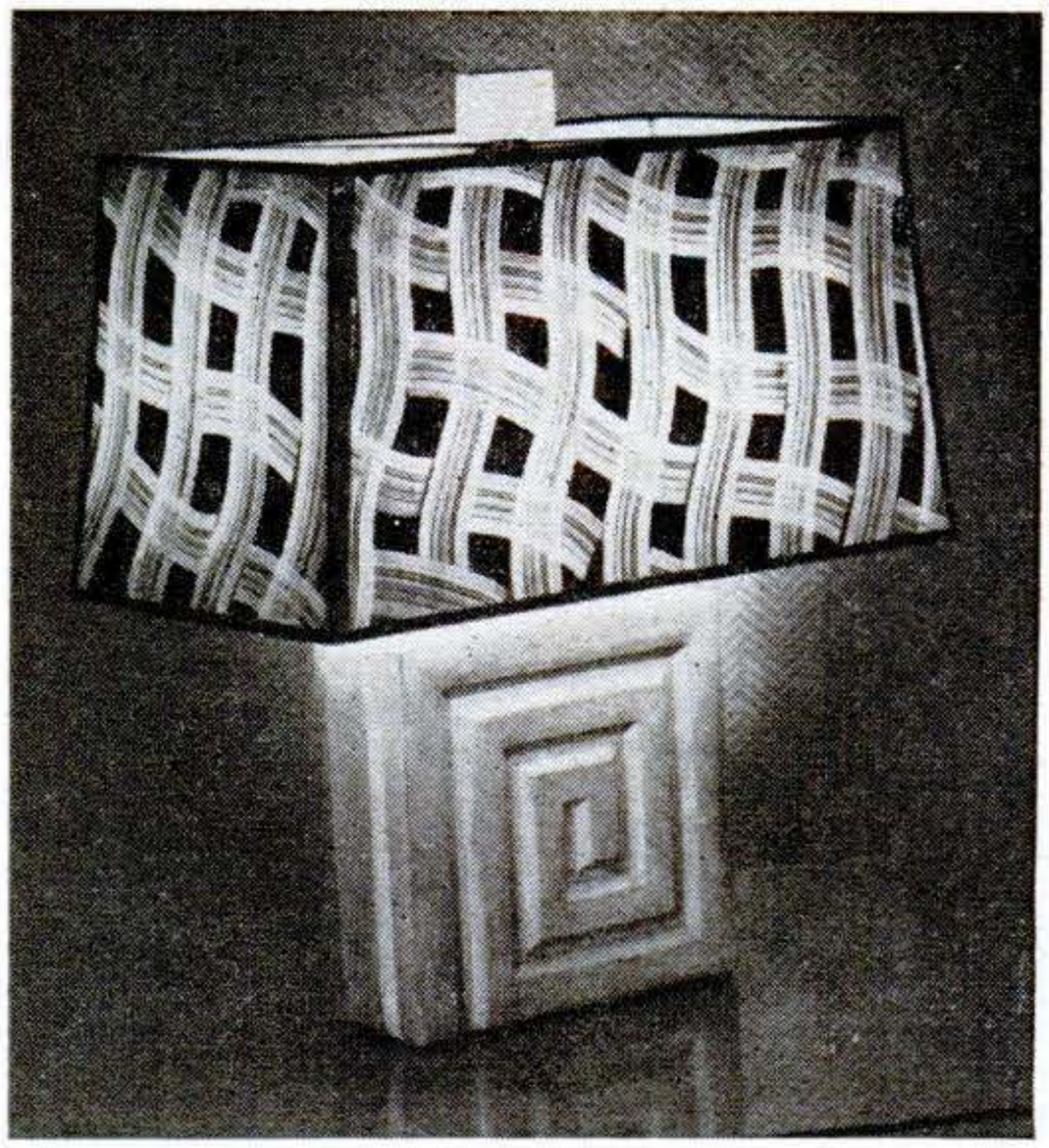


NEW! UNIVERSAL'S **UNIFLEX**
"The expert's reflex." 17 expensive features. UNIFLEX I—Coated f4.5 viewing, f5.6 taking lens 48.00
UNIFLEX II—f3.8 viewing, f4.5 taking lens..... 75.00



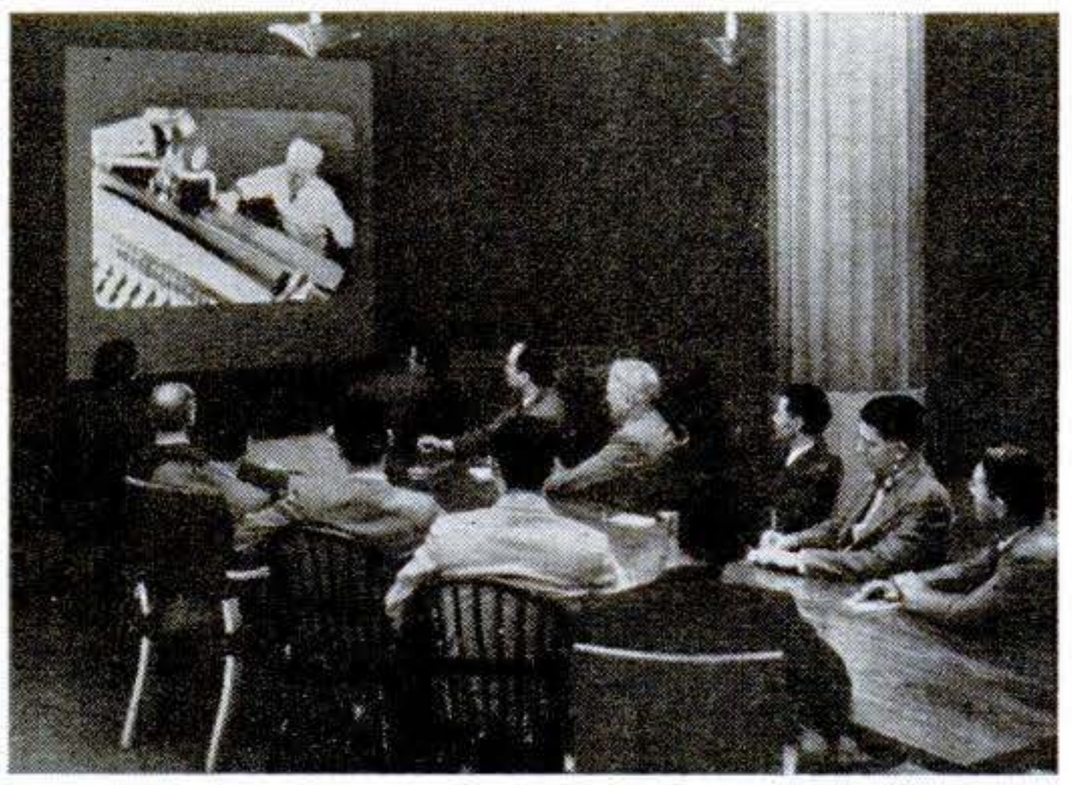
NEW! UNIVERSAL'S **ROAMER**
More "good picture" features than any other folding camera.
ROAMER I — Coated, color corrected lens 29.75
ROAMER II — Coated f4.5 lens, speeds to 1/200th, 48.00

For Pictures that *Click*...click a UNIVERSAL



Lampshade in Plastic

A LAMPSHADE of durable Lumarith plastic not only gives more uniform diffusion of light, but its smoother surface makes it an appropriate "canvas" for a hand painting. The design on the lampshade above, produced by Lamp Fair, of New York City, gives the illusion of a third dimension when the lamp is lighted.



Projects Brighter Pix

SHARP screen images are possible without shutting out all the light in a room when the new Kodaslide Projector is used. Built for projecting 2- by 2-inch slides and transparencies, this Master Model has a 1,000-watt lamp and extremely fast lenses —coated with a microscopically thin layer of magnesium fluoride—that increase the amount of light delivered to the screen. The projector is made by the Eastman Kodak Co., of Rochester, N. Y.

Copyrighted material

Dependable

CHAMPION

America's Favorite Spark Plug

Crisp-firing spark plugs are a primary factor in keeping your car's engine in good operating condition. They are truly vital in maintaining its *performance, gas and oil economy, and dependability*. It's Spring again, so have your spark plugs checked. If new ones are needed, insist on the spark plugs preferred and used by most motorists — *dependable Champions.*
Champion Spark Plug Company, Toledo 1, Ohio.

FOLLOW THE EXPERTS **DEMAND NEW DEPENDABLE CHAMPIONS FOR YOUR CAR**

Listen to CHAMPION ROLL CALL, Harry Wismer's fast sportscast every Friday night, over ABC network

Copyrighted material

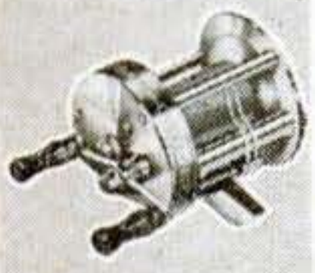
Listen, pal-

HERE'S A FISHIN' FOURSOME THAT'S TOPS!

The No. 411 South Bender rod—the No. 750 Perfectoreno reel—a Black-Oreno nylon line—a world-famous Bass-Oreno lure . . . Man, there's matched tackle that's tops. It's quality-built for perfect casting and the finest of fishin' fun.

No. 411 SOUTH BENDER ROD

"Action you've never experienced before in a rod," anglers say. It adds a new thrill to bait casting. Controlled flexibility produces a live suppleness that gives just the right whip for perfect, effortless casting. Length 4′ 11″ . . **$15**



No. 750 PERFECTORENO REEL
No Thumbing—No Backlashes

Makes casting easy, effortless and a real pleasure. Precision-built. Level winding. Chrome-plated frame . . **$10**
Others priced at . . . . **$11** and **$13.50**

No. 973 BASS-ORENO
Famous Fish-Getter

World's greatest—and most imitated—bait. Darting, diving action that gets results. Six finishes, **$1.10** each. Also available in 4 other sizes . . **65c** to **90c**

BLACK-ORENO LINE
The Line You Can Trust

World-famed bait casting line braided of nylon. Smooth finish, long-lasting quality. Easy casting. Waterproofed. 12 to 35 pound test. **$1.35** to **$2.50** per 50 yard spool.

FREE! NEW '48 BOOK ON FISHING

"Fishing—What Tackle and When" shows South Bend and Oreno Tackle. Color pictures of fishes. Fly and bait casting instructions. Every fisherman needs a copy. *Write for it today. FREE!*

SOUTH BEND BAIT CO., 892 HIGH ST., SOUTH BEND 23, IND.

BETTER FISHING INC

SOUTH BEND *A Name Famous in Fishing*

Glide

LIKE AN INDIAN GUIDE

Down the twisting streams, across the ruffled lakes, your Old Town Canoe is your dependable friend for fishing and hunting. Sturdy and strong for long trips, yet light and easy to carry. Perfectly balanced. An Old Town is designed like a birchbark, but built for many years of adventure and sport. Easy to own.

FREE CATALOG shows all kinds of canoes for paddling, sailing or outboards. Also outboard boats, big all wood family boats. Sailboats. Rowboats. Dinghies. Write today. Address Old Town Canoe Company, 445 Wood Street, Old Town, Maine.

"Old Town Canoes"

No other tool like it!

BURGESS vibro-tool

Trade Mark Reg. U. S. Pat. Off.

Writes on . . .
- Watches
- Glassware
- Tools
- Leather
- Plastics
- Costume Jewelry
- Pots and Pans
- Sporting Equipment

$7.50

Engrave your name . . . etch letters or designs . . . place permanent identification marks on anything with this unique hand tool. Carves wood and linoleum, cuts cardboard and balsa, tools leather. Just plug in on any 110 volt AC line. No home shop is complete without a Burgess Vibro-Tool. See your dealer or write for information.

DELUXE KIT

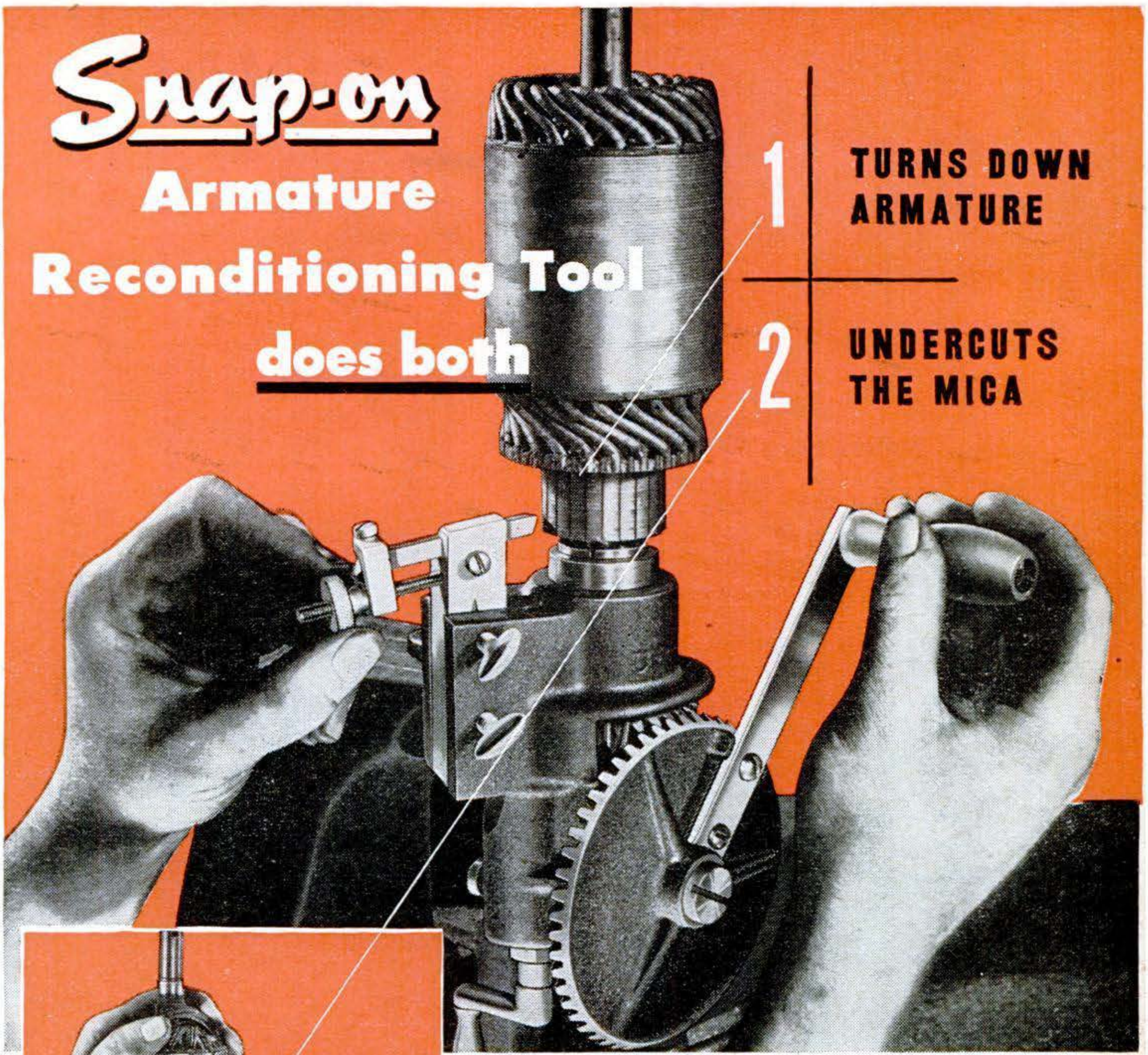
Vibro-Tool complete with 22 attachments in handsome, polished wood chest. **$16.50**

BURGESS Vibro-Tool Division

LAKE ZURICH, ILLINOIS

Copyrighted material

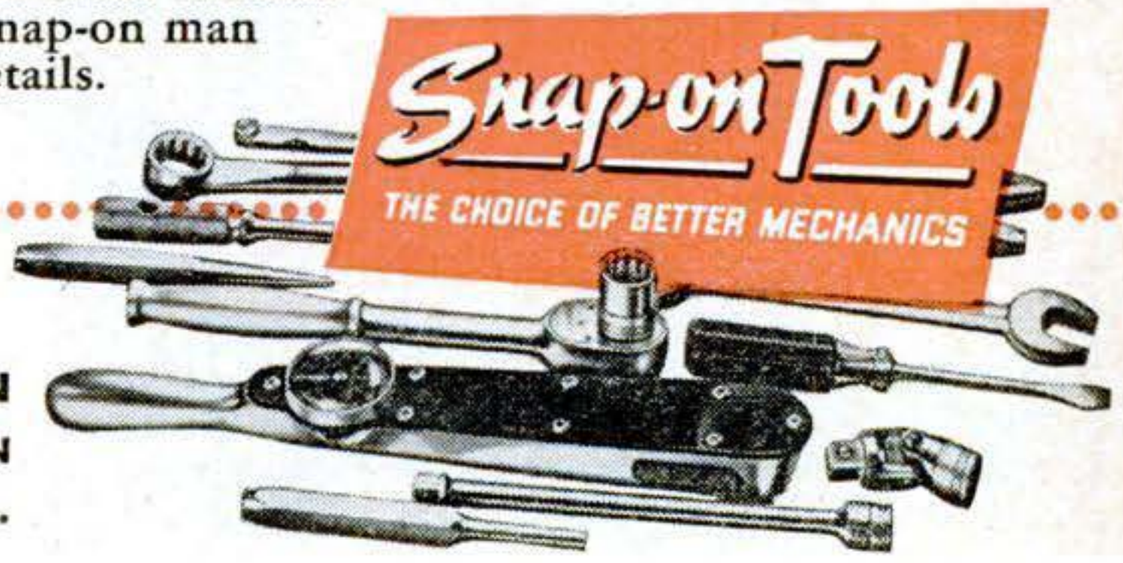
Snap-on Armature Reconditioning Tool does both



From start to finish, Snap-on Armature Reconditioning Tools are engineered to do an accurate turning and undercutting job. This unit requires no motor . . . no special centerless chuck. Simply lock it in a vise, insert armature shaft, and it's set to do an exact job, quickly, and with important savings in time and in capital investment, because it's faster to use than an ordinary lathe. The depth of the cut can be controlled to the finest shaving . . . the downward lead is fully automatic.

Undercutting the mica is just as simple . . . and when you finish the job by touching up the commutator with fine sand paper, the operation is completed to the entire satisfaction of even the most critical.

Ask the Snap-on man for full details.

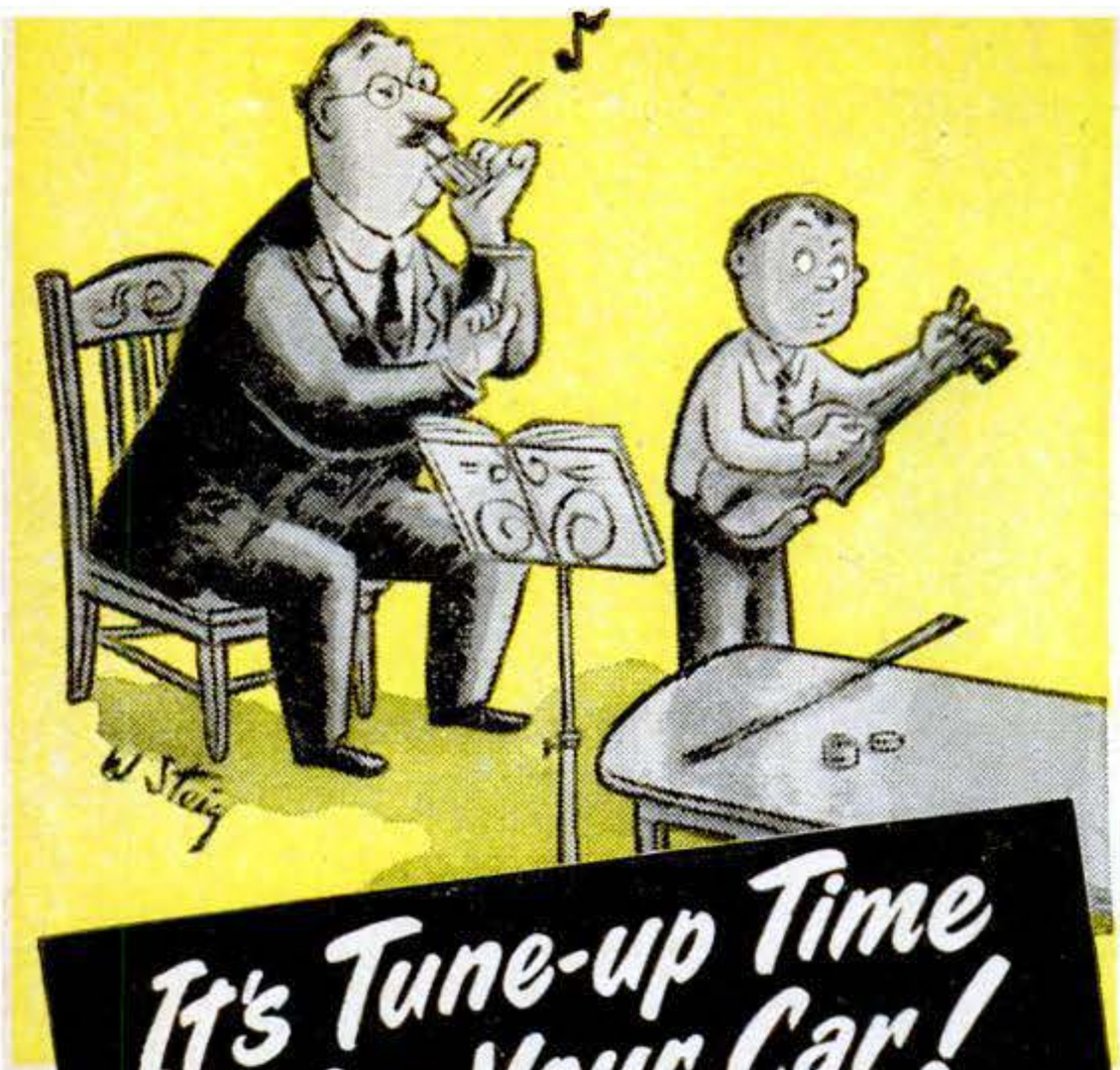


SNAP-ON TOOLS CORPORATION

8060-E 28th AVENUE • KENOSHA, WISCONSIN

International Division: Kenosha, Wisconsin, U. S. A.

Copyrighted material



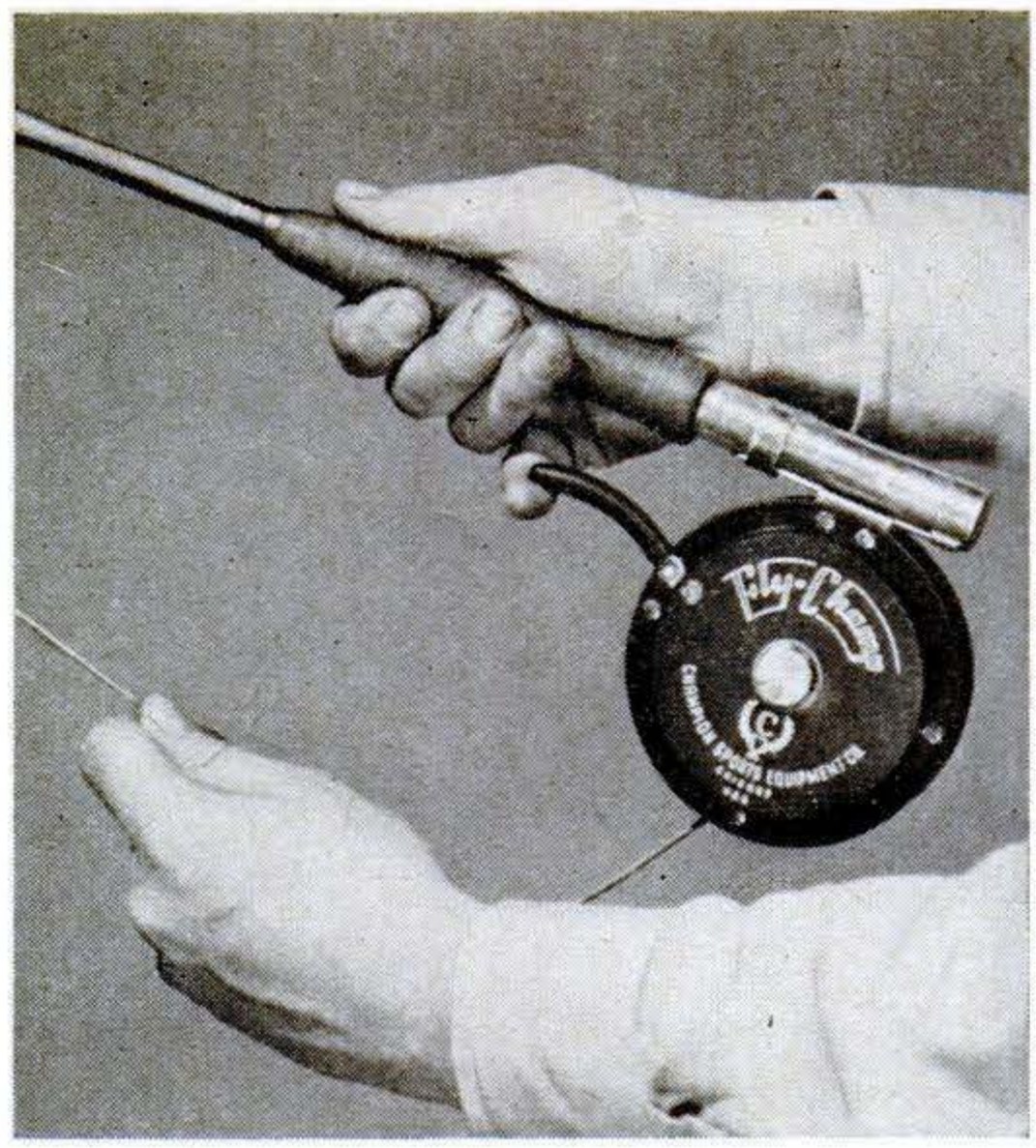
It's Tune-up Time for Your Car!

It's time to clean up winter's sludge and gum—step up your engine's performance—with Casite!

And it's high time you gave your engine Casite's extra protection too! Casite cuts engine wear because it improves lubrication—gets oil around quickly and into the tight spots. Casite guarantees Better Motor Performance or Double-Your-Money-Back, no matter what kind of motor oil is used.

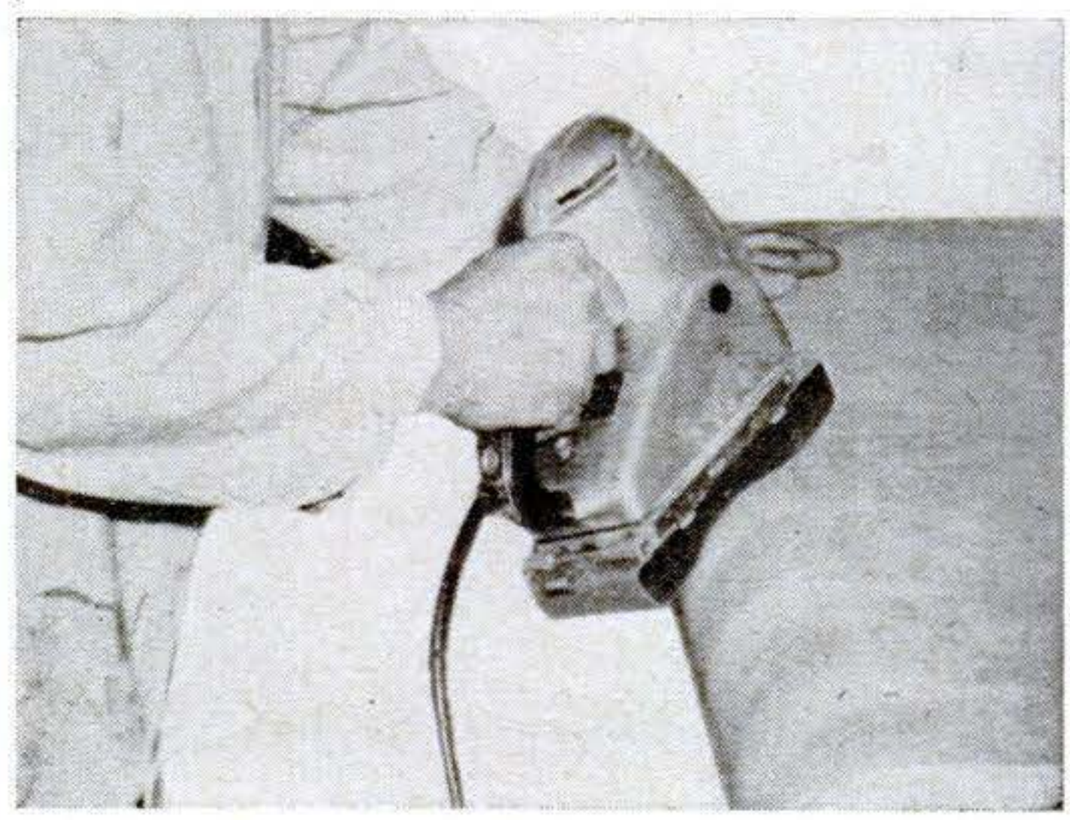
Get a Casite tune-up today—from your garage, service station or car dealer. The Casite Corporation, Hastings, Michigan and the Casite Division, Hastings Ltd., Toronto.

75¢ a pint
95¢ in Canada



Versatile Fishing Reel

HERE'S a reel for fly fishing that will please anglers who want either automatic or manual right-hand line take-up. The finger-operated trigger shown above controls the automatic take-up and folds back when manual operation is desired. If a change in line is needed, an auxiliary spool can be inserted in the reel in place of the one being used. The Champion Sports Equipment Co., of Chicago, makes the reel.



Pad Smooths Curves

UNIFORM sanding of curved surfaces is possible if you use a new sponge-rubber pad, shown above attached to a portable electric sander. It serves as a flexible, inch-thick backing for the abrasive sheet so that it can follow the curves. The pad is adaptable to all No. 1,000 sanders made by Sterling Tool Products Co., of Chicago.

Copyrighted material

Regular $15.00 Value

SUPER-SENSATIONALLY PRICED

It only $2.49 *including convenient leather case*

Men's and Women's sizes!

Imagine! These attractive, optically-correct sun glasses at such a bargain price! *U.S. Gov't. approved for meeting all specifications for absorption of ultra-violet and infra-red rays.*

DON'T BE A SUMMER AND WINTER SQUINTER!

Effectively protect your eyes from harsh glare of summer sun and winter snow. Wear these smartly-made, official Army type sun glasses for carefree, glare-free pleasure . . . the year 'round!

- *Ground and polished 4 base lenses.*
- *Gold plated adjustable frames.*
- *Pearloid sweatband and pads.*
- *Made to highest optical standards.*
- *Absolute satisfaction guaranteed or money cheerfully refunded.*

LIFETIME GUARANTEE!

If at any time during the life of these sun glasses you return them to us for repairs, we will be glad to fix them for a nominal service charge of 50c.

AMERICAN HANDICRAFTERS, INC.

Division of S & B Surplus Sales Co.

2905 W. Madison St. Chicago 12, Ill.

HURRY! FILL OUT AND MAIL THIS ORDER COUPON NOW!

AMERICAN HANDICRAFTERS, INC., Dept. S5
2905 W. Madison Street, Chicago 12, Ill.

Please send me_____men's_____women's SUN GLASSES.

☐ Send C.O.D.

☐ Enclosed find check or money order for $2.49 pr. postpaid.

Name_____

Address_____

City & State_____

(Illinois residents add 2% ret. occ. tax)

Copyrighted material

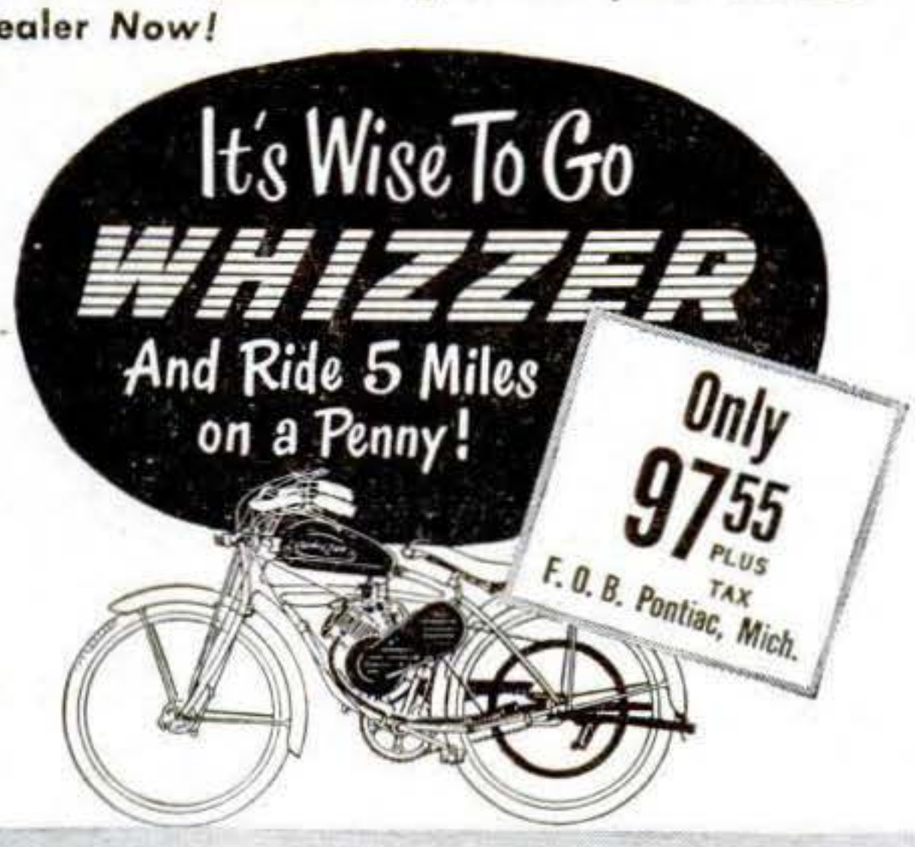
Now, AC introduces, for automotive service, insulators made of the *patented* wide Heat Range aluminum oxide material, which was used exclusively in aircraft plugs for American planes during World War II. AC has consistently been *first* in basic spark plug improvements—pioneering such revolutionary advancements as the one-piece plug—the welded side electrode—the unglazed insulator tip—the complete Heat Range of plugs in every thread size—and *now* the patented aluminum oxide insulator.

That's why AC Spark Plugs are tops in performance—why you should choose them for utmost reliability.

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION

"Stop Pedaling, Pal...Get Wise to WHIZZER!"

Cover the town for a penny—with a WHIZZER Motor on your bike. Good-bye, pedal pushing—with 2½ rugged horsepower to take you everywhere. 125 miles to a gallon of gas! See your Whizzer Dealer *Now!*



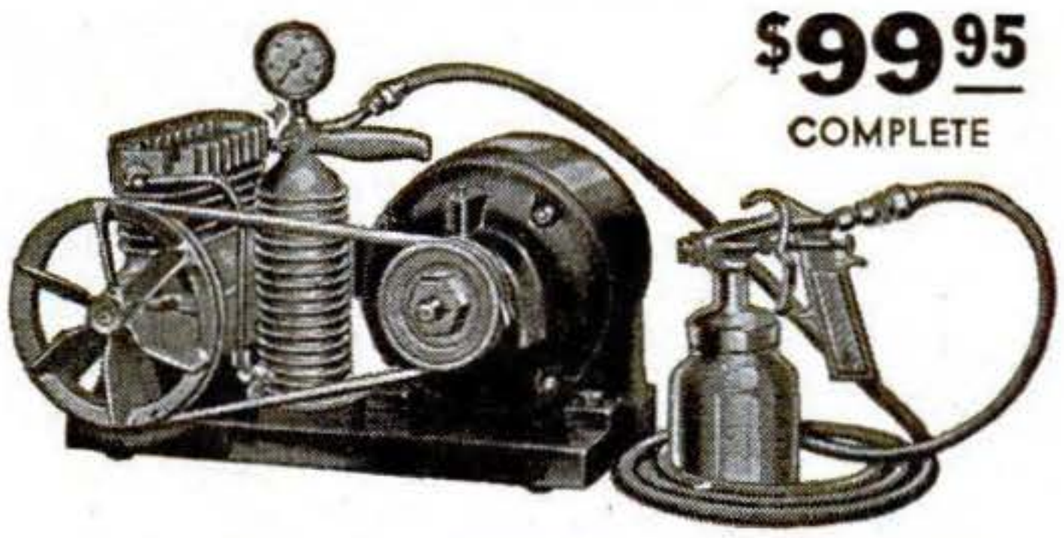
★ America's only proved 4-cycle bike motor!
★ Speeds up to 35 m.p.h.
★ Complete with all attachments!
★ Nation-wide network of 3,500 Whizzer Dealers!

Your Whizzer Dealer is as near as your telephone . . . or write Whizzer Motor Co., Pontiac, Mich.—world's largest bike motor builder.

PRESSURE QUEEN

FOUR CYLINDER
PORTABLE AIR COMPRESSOR
SPRAY PAINTING OUTFIT

$99.95
COMPLETE



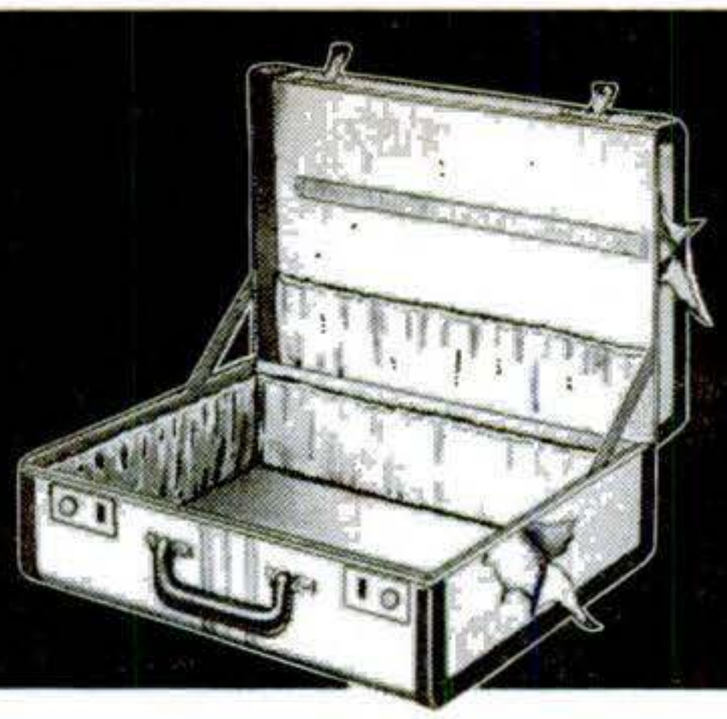
COMPACT • RUGGED • POWERFUL

The ideal air supply for home and farm workshop, machine shop, garage, service station and contracting painter. Inflates tires; refinishes automobiles, trucks, implements and furniture. Paints buildings better, faster and at lower cost than brush work. Compressor has 4 cylinders, drop forged crankshaft, heat treated valves and pistons, bronze bearings, forced feed lubrication. 50-60 lbs. pressure without pulsation. Price includes compressor as shown, with air gauge, 15 ft. hose, spray gun and ⅓ h.p. motor; fully guaranteed. With ½ h.p. motor—$109.95.

IF YOUR DEALER DOES NOT SELL PRESSURE QUEEN WRITE DIRECT.

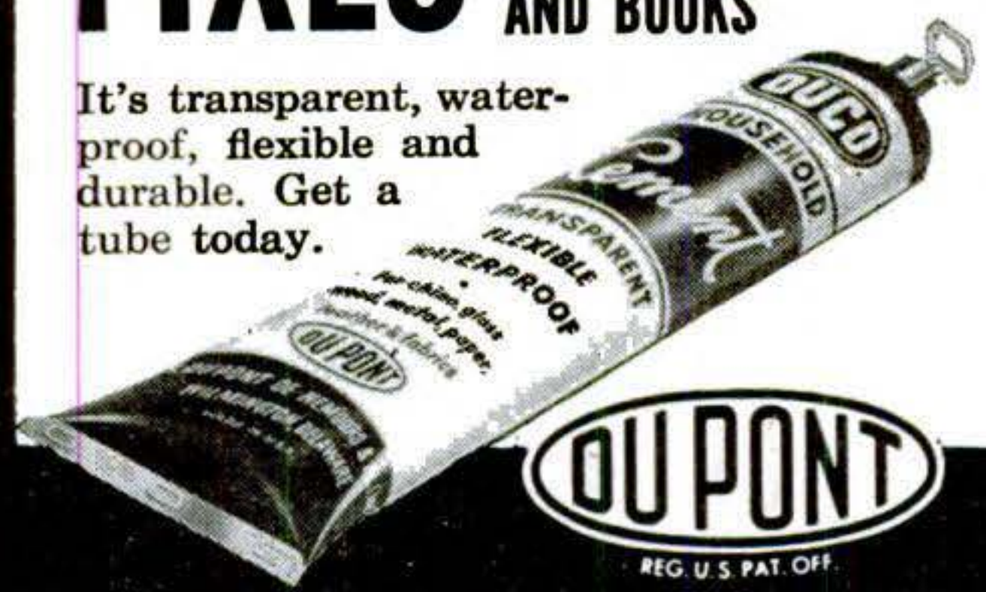
THE CAMPBELL-HAUSFELD CO.
151 RAILROAD AVE. HARRISON, OHIO

Copyrighted material



FIXES LUGGAGE, FURNITURE, DISHES, TOYS, AND BOOKS

It's transparent, waterproof, flexible and durable. Get a tube today.



DU PONT
REG. U. S. PAT. OFF.

DUCO CEMENT

REG. U. S. PAT. OFF.

Say You Saw
It In Popular Science

V-8 DUALS & SINGLES

DEALERS WANTED

MUFFLERS
STEELS and ALUMINUMS with a motorboat tone

SINGLES, Chev., V-8, Plymouth, Steels $5.50, Aluminum $7.00. Chry., Olds., Buicks, etc., Steels $7.50, Aluminum $9.00. V-8 and MERCURY DUALS, Steel $17.50, Aluminum $21.00. Split Manifold Sets, Steels $35.00, Aluminum $45.00. Aluminums are guaranteed for life of your car.

SANDEE MUFFLER CO.

BOX 296 LA TIJ., LOS ANGELES 43, CALIF
2624 W. SLAUSON AVE., LOS ANGELES, CALIF.

Look your best ...save money, too

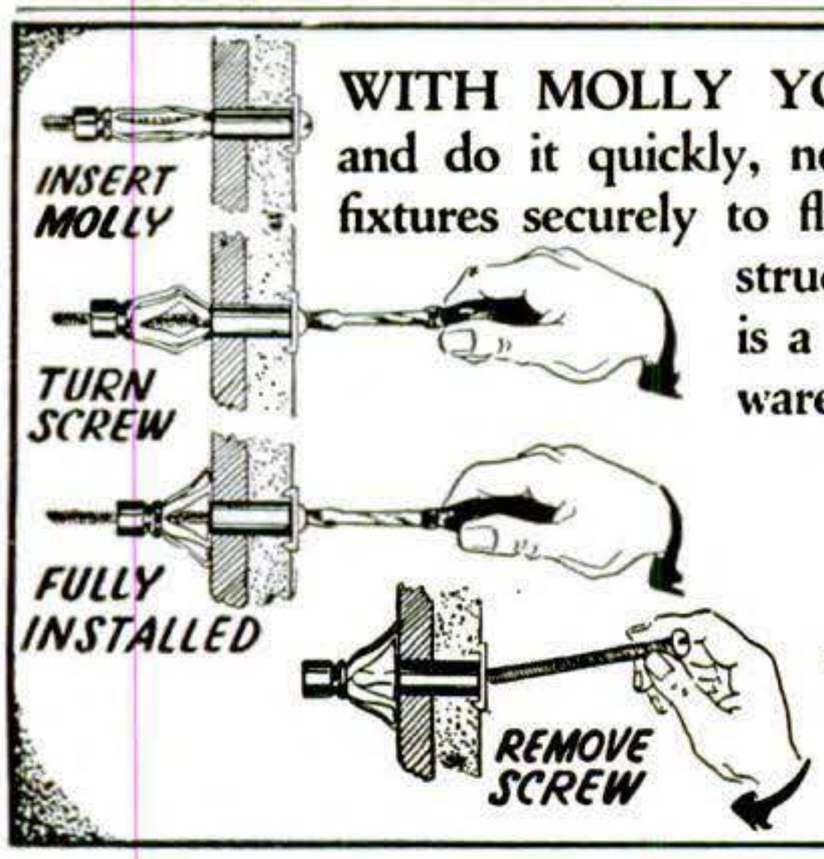
STROPS—CLEANS WITHOUT REMOVING BLADE

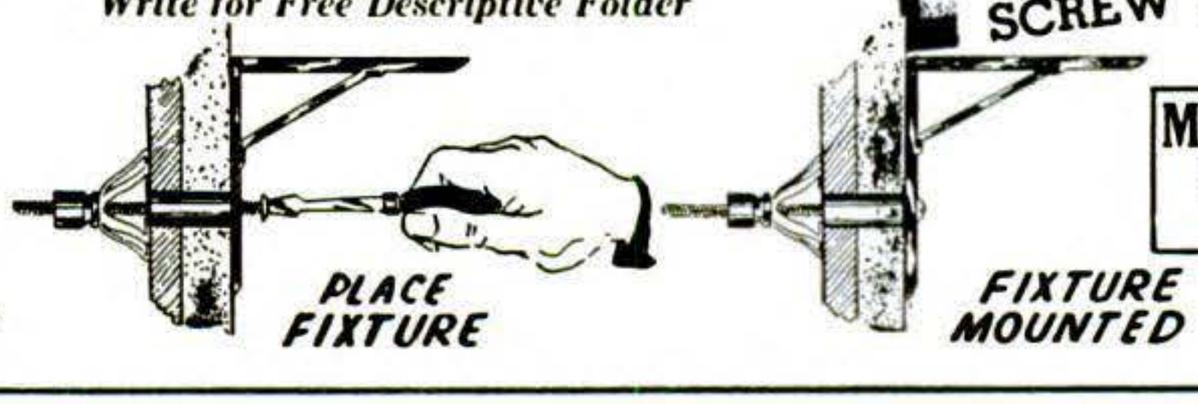
RAZOR, STROP AND 5 VALET BLADES $1.25

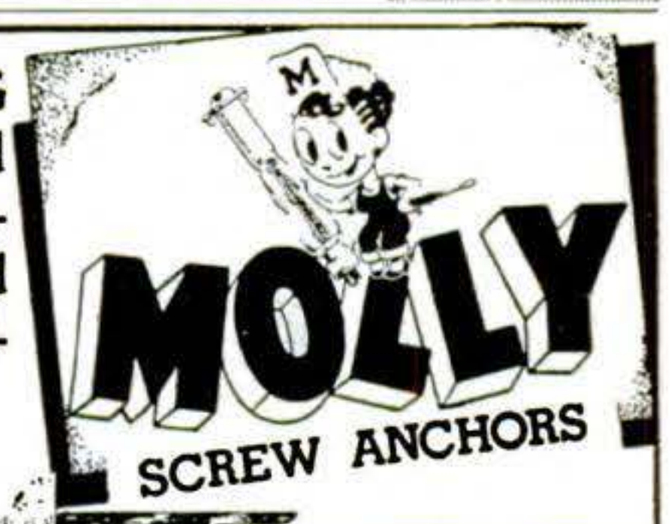
SELF-SHARPENING . . . ONE PIECE

WITH MOLLY YOU CAN FASTEN ANYTHING and do it quickly, neatly and safely. MOLLY will hold fixtures securely to floors, ceilings or any hollow wall construction... Simple to install, all you need is a screw driver. Sold by leading hardware stores everywhere.

Write for Free Descriptive Folder

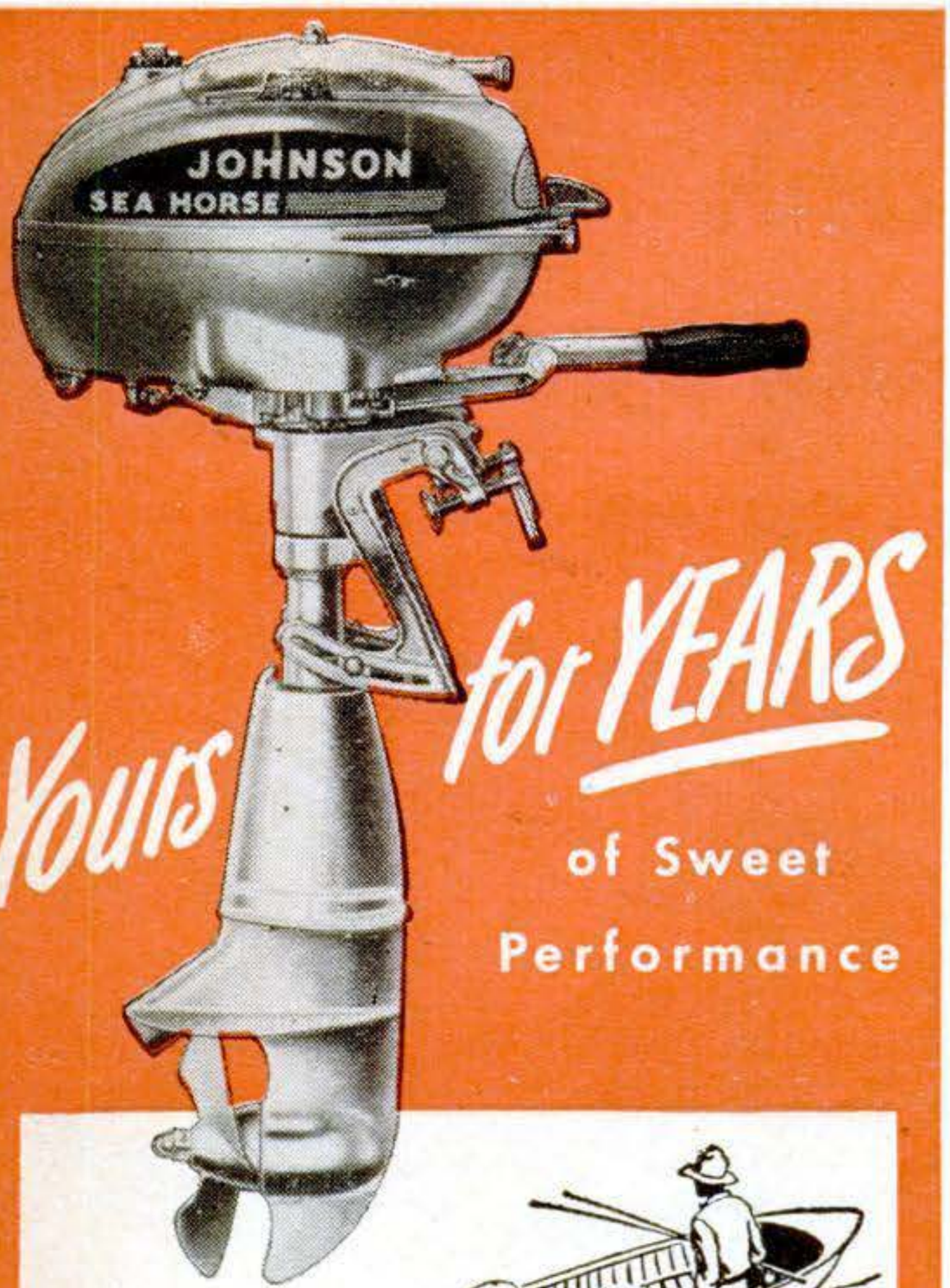






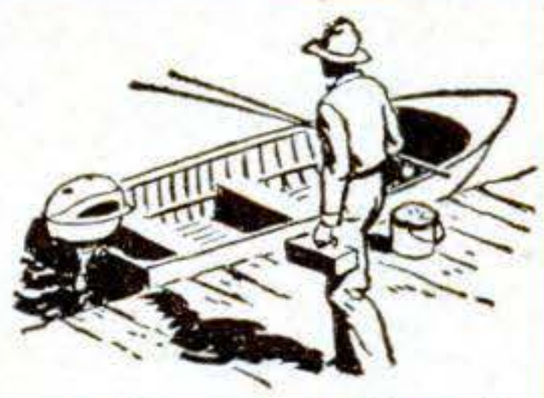
MOLLY CORP.
522 COURT STREET
READING, PA.

Copyrighted material



Yours for YEARS

of Sweet Performance



When you look for quality features in an outboard motor, look for them in the line where they were originated, developed, and perfected!

- Perfected Alternate Firing
- Dual Carburetion
- Reverse
- Rotary Valve
- Shock Absorber Drive
- Ready-Pull Starter
- Die Cast Cylinder Block
- Anti-Cavitation Plate

these, and more, are *Johnson* developments

JOHNSON SEA-HORSES for DEPENDability

FREE HANDY CHART

New! Illustrates and charts the 5 great Johnsons for '48. Sent free. Write... Look for the name of your Johnson dealer under "Outboard Motors" in your classified telephone book.

JOHNSON MOTORS, 500 Pershing Rd., Waukegan, Illinois

Johnson Motors of Canada, Peterboro, Canada

World's easiest welding with this NEW 180 AMP. LINCOLN

$150.00 Freight Prepaid

Lincoln Electric announces a new 180 amp. AC arc welder . . . the "Lincwelder." This welder has the same exclusive features as larger Lincoln industrial AC welders, *yet it sells at the lowest price of any arc welder of its size.*

Its "Arc Booster" makes welded repairs easier and broadens your opportunities for greater income with arc welding. Welds broken parts. Hard-faces worn parts. Builds new equipment of all kinds. Range 20 to 180 amperes with "dial tuning" control. No plugs to shift. See the new "Lincwelder" 180 AC at your nearest Weldealer. Try it yourself . . . or write for details in Bulletin 370.

THE LINCOLN ELECTRIC COMPANY
Dept. 311 • Cleveland 1, Ohio
Largest Manufacturer of Arc Welding Equipment in the World

"EVEREADY" Flashlight Batteries Outlast All Other Brands!*

**According to the "General-Purpose 4-Ohm Intermittent Test" of the American Standards Association.*

KEEPS YOU RIGHT

When You Could be Wrong

AUTOMOBILE COMPASS $5.95 (Illuminated)
AUTOMOBILE COMPASS (Standard) **$3.95**
BOAT COMPASS $2.75
BY HULL

HULL MFG. CO., P. O. Box 246-C5, Warren, Ohio

The SPEED SAW FILER

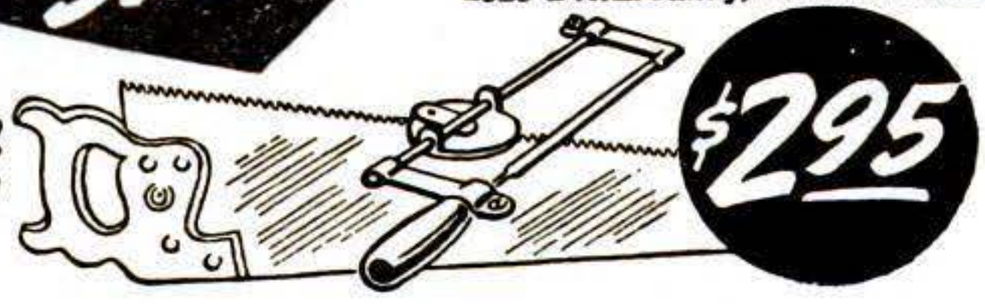
Saves You Time, Money

Now FILE Your Own SAWS

Now you can do expert saw filing at home. Lifetime tool makes precision filing easy for even the most inexperienced. Two simple adjustments make it fit any type hand saw. Keep your saws extra sharp and true-cutting with a Speed Saw Filer. Complete with file, ready to use. Money back guarantee. Cash with order, prepaid (C.O.D. postage extra.)

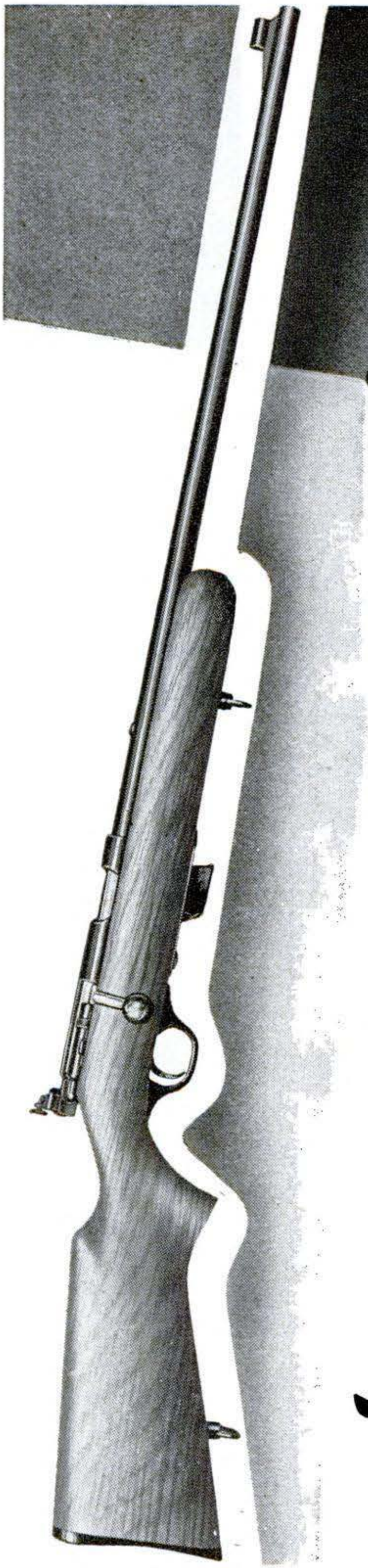
THE SPEED CORP.
2025-B N.E. Sandy, Portland 12, Ore.

ORDER NOW!



$2.95

Copyrighted material



More Sport for your money with

Marlin's CLIP MAGAZINE .22

IT'S a whale of a value—this man-sized .22 repeater! A real Marlin, ready for instant action on vermin or small game. There's eight rapid-fire shots in the clip to get 'em, no matter how fast they run. You'll get the most sport for your money with a Marlin 80-DL!

Look over these specifications for big value at low cost!...

American Walnut buttstock, with fluted comb and semi-beavertail forearm.

Quick-release trigger; self-cocking action; side ejection; Off and On safety.

24" tapered blued steel barrel; Ballard type rifling; crowned muzzle.

8-shot clip magazine. Shoots .22 caliber short, long, long rifle cartridges—regular and high speed without adjustment.

Equipped with peep sight, hooded ramp front sight and sling strap swivels.

BOYS: Be a Ranger! Write Sportsmen's Service Bureau, 343 Lexington Ave., New York, for FREE booklet on marksmanship.

Marlin's 80-DL is a go-getter for small fur-bearing game—fox; squirrel; woodchuck; muskrat; mink.

A handy target rifle with its clip magazine, the 80-DL also takes care of marauding crows, hawks and rats.

Marlin 80-DL

8-shot Clip Magazine
.22 Cal. Repeating Rifle

$22.90 *Price slightly higher west of the Rockies and in Canada.*

THE MARLIN FIREARMS CO., NEW HAVEN, CONN. • *Fine Guns Since 1870*

Copyrighted material

Speed Sweep

THE BRUSH WITH THE STEEL BACK

MD

Sweeps cleaner, faster — Out lasts ordinary brushes 3 to 1!

Mail Coupon Today

Milwaukee Dustless Brush Co.
530 N. 22nd St., Milwaukee 3, Wis.

Please send me complete information about Speed Sweep brushes.

Name _____

Street Address _____

City, State _____

Cushman MOTOR SCOOTER

A Real "EXTRA HAND"

"The Cushman is our handiest farm helper . . . on the go all the time." That's what farmers everywhere are saying. Cushman is the newest in streamlined farm power. Operates for one-fifth the cost of running a truck, tractor, or station wagon. Rugged, too, has 4 H. P. Cushman "Husky" Engine, Automatic Clutch, Knee Action, 3-Wheel Brakes. Dealers Everywhere.

FREE Write for free folders, name of your nearest Cushman dealer and **Free Demonstration Ride** coupon.

CUSHMAN ENGINES

For 47 years Cushman has produced high quality small air-cooled and water-cooled engines. These engines are available to original equipment manufacturers and other users. Write for details.

CUSHMAN MOTOR WORKS, INC., Dept. S-500, Lincoln, Nebr.

PULVEX FLEA POWDER

TWO KINDS

WITH 5% DDT
. . . for dogs. Kills fleas and lice quick. Keeps fleas off 5-7 days. Many home uses.

OR WITH ROTENONE
. . . for cats, dogs. Quickly kills fleas, lice. Kills fleas when put on a single spot. Pre-war formula.

EITHER KIND: 25c & 50c

REPLACEMENT OR REFUND OF MONEY — Guaranteed by Good Housekeeping — IF NOT AS ADVERTISED THEREIN

AIR CORPS Type P23 Headphones

AT A FRACTION OF ORIGINAL COST
8000 ohm impedance, bipolar magnets. Extremely comfortable sponge rubber cushions, stainless steel leather covered headbands, concealed terminals. **6 ft. cord with PL55 plug. BRAND NEW.** $15.00 Value.
No. 5A134 Spec. Per Pair..... $2.95 **Plus 25c each for Postage.**

FREE Catalog on Everything in Radio and Electronics.

Burstein-Applebee Co. 1012 McGee, Kansas City 6, Mo.

OWN A Printing Business

Cards, Tickets, Stationery, etc. Good profit in spare time. **PRINT YOUR OWN** greeting cards, movie titles, church work, etc. Save money. Easy rules supplied. Raised printing like engraving too. Have home shop. Sold direct from factory only. Send dime for supply book, suggested outfits, all details and advice on your needs. No obligation. **KELSEY, INC. C-33, MERIDEN, CONN.**

IT STAYS STUCK!

WITH . . . MULTI-PURPOSE AMBROID

If you want permanent results from an adhesive, you can't equal multi-purpose Ambroid liquid cement — for home workshop, household or factory. A quality leader for 37 years, ready-to-use Ambroid is waterproof, transparent, quick-drying, extra strong. Flexible, heat-and corrosion-resistant. For assembling, repairing or mending jobs, keep Ambroid handy. At your dealer's, or send 25¢ for big 2-oz. tube postpaid. Money back guarantee.

Also 50¢ 4-oz. tube. Pts., qts., gals., for industrial use.

AMBROID

306 Franklin St., Boston 10, Mass.

Copyrighted material

All 7 of these low-cost HOMECRAFT® Power Tools

a complete home shop of your own!

Only $218.50

(All prices without motors or lamp attachments)

Now! . . . you can start that workshop you've dreamed about — or expand your present shop — *without spending a lot of money.*

Yes, *you* can have a *real* shop — filled with Homecraft Power Tools — for only $218.50. These popular tools are designed just for people like you — hobbyists who use tools off and on, folks who want a lot of dependable service . . . a lot of fun . . . a lot of healthful relaxation!

Ask your Homecraft dealer to show you his complete display of Homecraft Power Tools.

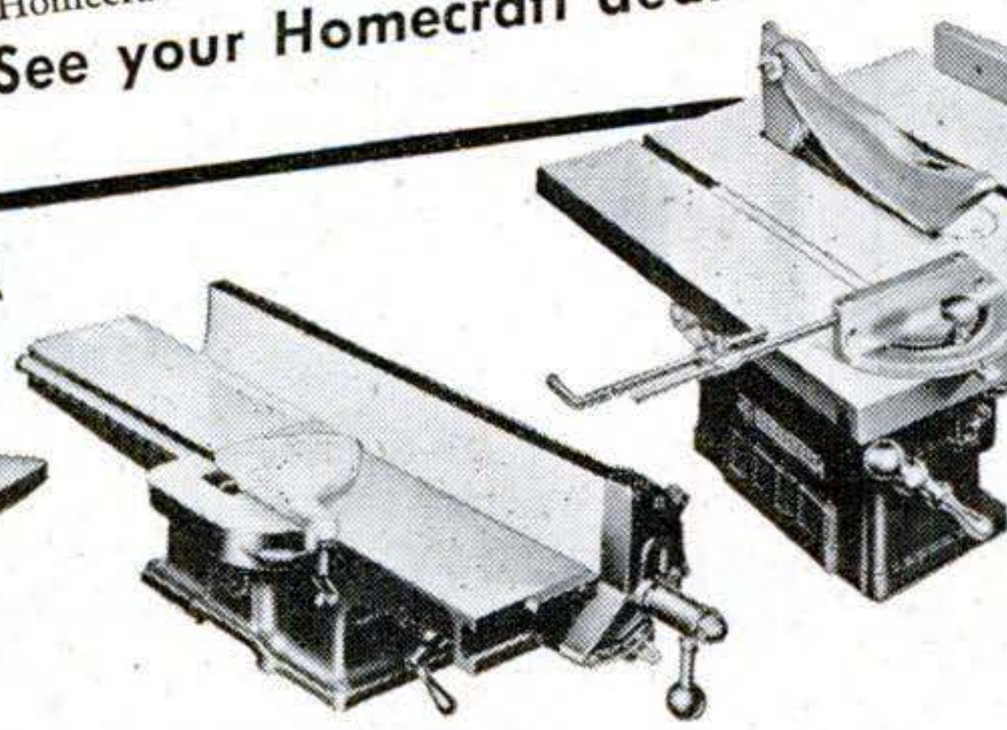
See your Homecraft dealer now!

Homecraft Scroll Saw, No. 40-110 — Cuts up to 2" thick, to center of 32" panel. Has speed of 1275 cutting strokes per minute. Table tilts 45° right, 15° left..... **$29.95**

Lamp and Motor Extra

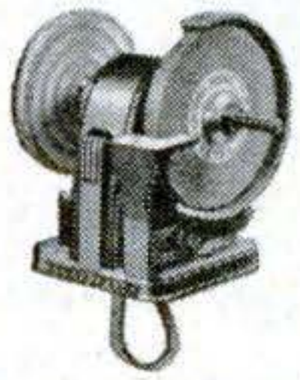
Homecraft Band Saw, No. 28-110 — Has 6½" capacity under guide and throat capacity of 9⅝". Fully-adjustable blade guides. Table tilts 45°.... **$36.95**

Lamp Extra

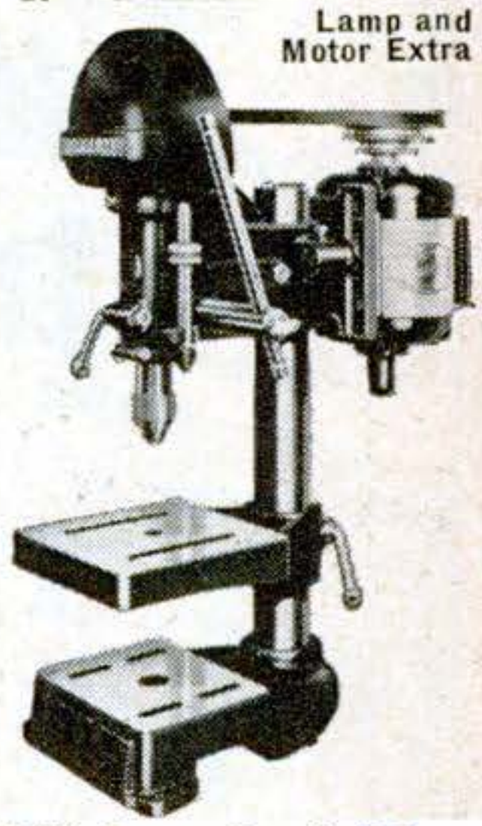


Homecraft Jointer, No. 37-110 Planes wood up to 4" wide. Cuts ¼"-deep rabbets. Has lubricated-for-life ball bearings. Fence tilts 45° to right and left..... **$29.95**

Homecraft Circular Saw, No. 34-110 — Cuts stock up to 2¼" thick. Rips to center of 15" panel. Takes moulding cutterhead and dado head up to 13/16" wide. Table tilts 45° to right..... **$34.95**



Homecraft Grinder and Buffer — Can be driven from either bottom or rear. Has long-wearing bronze bearings..... **$9.80**



Homecraft Drill Press, No. 11-120 — Four speeds from 700 r.p.m. to 4700 r.p.m. Has capacity up to ½" holes in cast iron. Oil-impregnated bronze bearings in quill. Ball-thrust bearing in spindle pulley..... **$41.95**

Motor Extra

Homecraft Lathe, No. 46-110 — Handles 36" of stock between centers. Swings 10" over bed. Spindle is carried on oil-impregnated bronze bearing. All thrust is absorbed by sealed-for-life ball bearings..... **$34.95**

HOMECRAFT POWER TOOLS

are built by the makers of Delta-Milwaukee* Power and Machine Tools—the tools with a widespread reputation for safety, accuracy, and dependability, in factories and schools, as well as home shops.

If your goal is a shop equipped with power tools that embody the most advanced principles of engineering, design, and construction, then insist on Delta-Milwaukee Power Tools.

*Trade Mark Reg. U. S. Pat. Off.

Free Catalog Sheets! Show all Homecraft Power Tools and accessories. Use coupon, to get your copies.

Tear out coupon and mail today!

DELTA MANUFACTURING DIVISION
Rockwell Manufacturing Company
683E E. Vienna Ave., Milwaukee 1, Wis.

Please send me free catalog sheets on Homecraft Power Tools and list of dealers in my area.

Name.....

Address.....

City.....(.....) State.....

HM-58

Copyrighted material

THE NEW

MONARK

Super Deluxe

Dream bike of the century! Super streamlined "air flow" design with new "Air-Wing" head shield and dozens of other exciting new features. New mar proof and chip resistant finish. For sale by better dealers everywhere.

MONARK SILVER KING, INC.
6501 West Grand Avenue, Chicago 35, Illinois
Send Free Folder B-64 showing complete new Monark line in full color.

NAME_____

ADDRESS_____

CITY_____ STATE_____

New BRUSH *Electroplater*

ESPECIALLY BUILT FOR MECHANICS, MODEL MAKERS HOME CRAFTSMEN

For
- MODEL MAKERS
- MAINTENANCE
- HOBBY SHOPS
- HOME SHOPS
- SALVAGE PARTS

Easy to Plate GOLD, SILVER, NICKEL, COPPER, etc... *For Pleasure and Profit!*

If you have a workshop—at home or in business—you need this new Warner Electroplater. At the stroke of an electrified brush, you can electroplate models and projects—you can replate worn articles, faucets, tools, fixtures, silverware, etc. with a durable, sparkling coat of metal... Gold, Silver, Nickel, Copper, Cadmium, *and after a bit of practice*, even Chromium! Everything furnished—equipment complete, ready for use. ***By doing a** bit of work for others, your **machine** can soon pay for itself.* So make your shop complete by getting a Warner Electroplater right away. Send today for FREE PLATING SAMPLE and illustrated literature. ACT AT ONCE.

WARNER ELECTRIC CO., Inc., Dept. S19
1512 Jarvis Ave., Chicago 26, Illinois

FREE *Details & Sample!*

WARNER ELECTRIC CO., Inc., 1512 Jarvis Ave., Chicago 26, Illinois, Dept. S19
Gentlemen: Send Free Sample and Details to:

*Name*_____

*Address*_____

*City*_____ *State*_____

Electrically Welded Endless *Paramount*

BAND SAW-BLADES

Made in widths from 1/8" to 1-3/4"

Make your band saw do more work for you. The proper width of blade will extend the scope of this important machine. Burrill's Paramount Blades are made from tough Nickel Alloy Steel properly tempered. Teeth accurately set and filed, and all saws carefully straightened. Send order and check today. Delivery will be made as promptly as conditions permit, from a few days to a week or two. You can obtain these saws at the following prices:

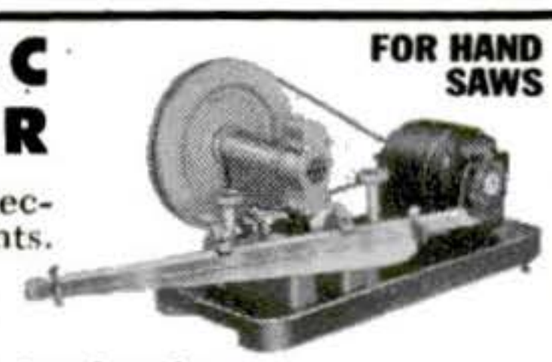
1/8"-3/16"-1/4"-3/8" wide, 5'6" long.....$1.04 each
1/8"-3/16"-1/4"-3/8" wide, 6'6" long.....$1.16 each
1/8"-3/16"-1/4"-3/8" wide, 7'6" long.....$1.27 each

Other sizes at proportional prices

NO C.O.D. SHIPMENTS ACCEPTED
State Make of Machine
Your satisfaction is guaranteed

BURRILL SAW & TOOL WORKS
405 E. Main St., Ilion, N.Y.

AUTOMATIC RETOOTHER



Cuts new saw teeth in 50 seconds—any size 4 to 16 points. Old teeth fall off as chips. Easy to operate. A perfect job.

Write today for details on

GREATER PROFITS FOR SAW SHOPS

BURR MFG. CO. 8943-R Venice Blvd. Los Angeles 34, Calif.

SKRU-KITS

20 Assortments—49c Each

Machine Screws, Wood Screws, Nuts, Washers, Cotter Pins, etc. Each assortment features one type fastener in wide variety of sizes and styles . . . Every fastener for your work. For workshops, garages, repair shops, hobbyists, mechanics. Stock up with several assortments at your favorite hardware counter. Look for STRONGHOLD!

Stronghold Screw Products Inc., 235A W. Hubbard St., Chicago 10, Ill.

TORNADO GAS TORCH

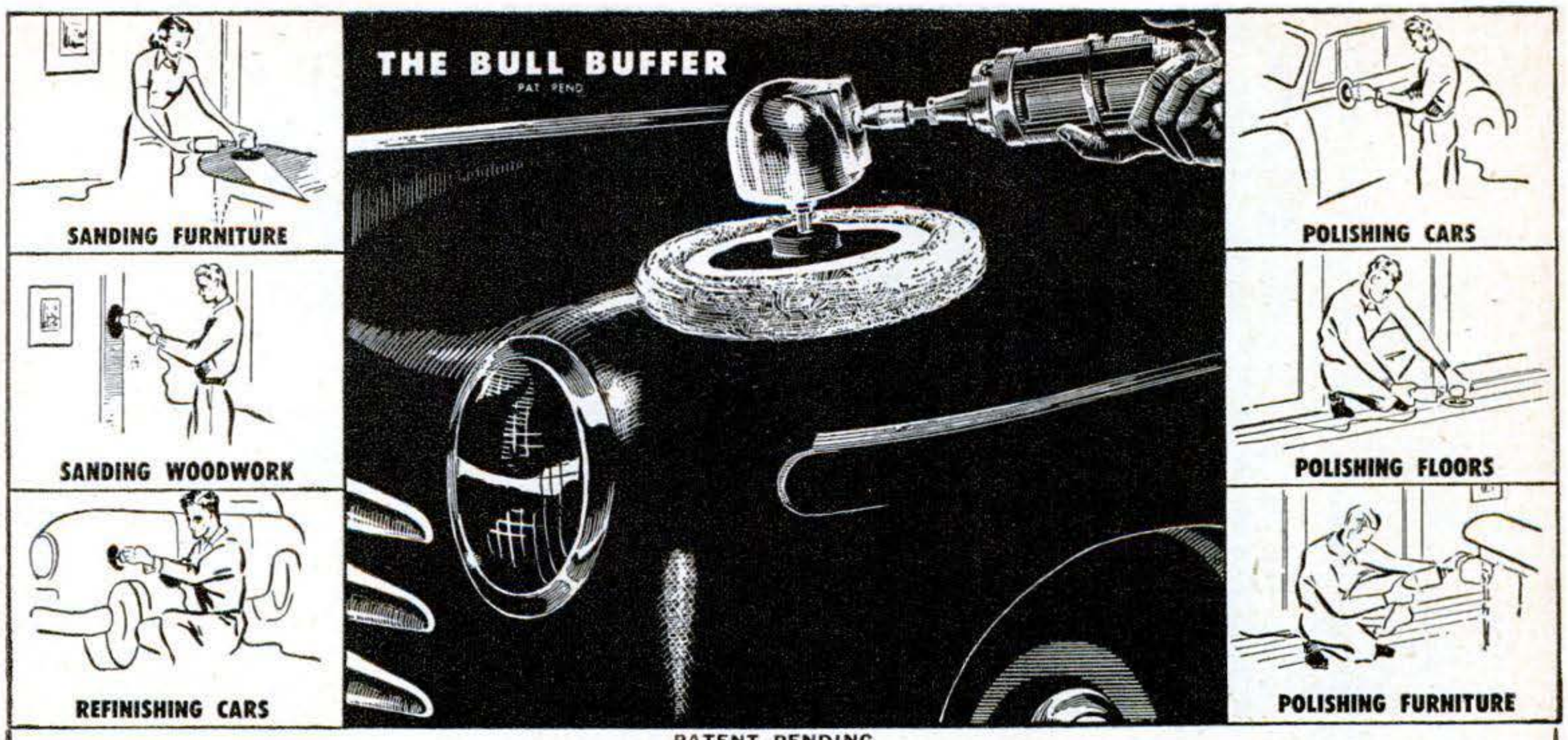
The Modern Way of Soldering

Ideal for hard and soft soldering. Will heat quickly; solder will flow freely and smoothly. No compressed air required. Self-adjusting. Safe. Economical. Can be used for annealing small parts and bending metal parts. Generates a heat of 1700° F. Simply connect to any illuminating gas jet with a rubber hose and operate. Tornado Torch No. 119 comes with three tips, (1/8", 1/4", 3/8" blast).

Tornado Gas Torch No. 119—Complete with 2 tips, for Natural Gas or Bottled Gas; with 3 tips for Manufactured Gas. $2.95 per set. See your dealer or order direct. Send check or money order—post paid.

Robco Corporation, 204 E. 44th Street, New York 17, N.Y.

Copyrighted material



PATENT PENDING

Used in
HOME
FARM
FACTORY
GARAGE
OFFICE BLDG.
STORE
SHOP
SERVICE STATION
CABINET SHOP
METAL SHOP
UPHOLSTERING SHOP

The **very first time** you polish your car, sand your own floors, refinish furniture, this tool has **more than paid for itself.** And what a kick you'll get out of doing all the polishing and sanding jobs that used to cost lots of money! With the Bull Buffer, you can do beautiful, **professional** work—make your car, furniture, floors, woodwork gleam like new. You'll find no limit to the ways Bull Buffer will save time and money in your home and business.

THE BULL BUFFER FITS ANY CHUCK ON AN ELECTRIC DRILL (OR FLEXIBLE SHAFT). Attach it quickly . . . polish and sand . . . then disconnect it and use your drill for any other purpose.

HIGHLY MANEUVERABLE, EASY TO OPERATE. Holding drill stationary, buffer can be turned in a **complete circle.** Bull Buffer easily reaches **all curved or flat surfaces.** It's **RUGGED—POWERFUL—BUILT TO LAST A LIFETIME.** Sturdy aluminum casting houses self-lubricated bearings and steel gears that operate in a bath of oil. All materials and workmanship are **guaranteed.**

The sooner you order, the sooner you'll have this handy new tool in your hands. It's a real bargain—only $9.95, **complete with five-inch rubber disc, sheepskin bonnet, and 2 sanding discs.** (Extra bonnets, $1.25—extra medium and coarse sanding discs, 10c each.) If your dealer doesn't stock, send cash, check or money order for $9.95, postage prepaid. C.O.D. plus postage. **$9.95**

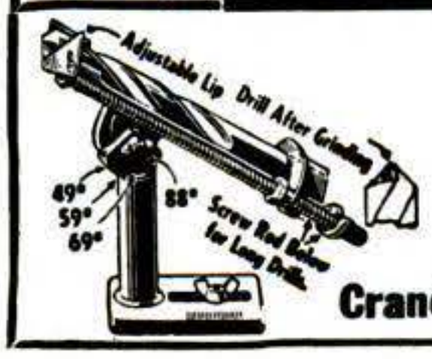
BERTRUM A. ENGINEERING COMPANY

3034 MAIN ST. KANSAS CITY, MO.

DEALERS WRITE FOR INFORMATION

NONE BETTER!

SUPER DRILL GRINDER



Sharpens round shank drills from 3/32" to 1 1/16" in diameter, up to 11" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee.

Price only $2.95
At Dealers or Postpaid

Crandall Mfg. Co. 1512 W. Slauson, Dept. FB-29 Los Angeles 44, Calif.

SPATTER CRAFT

• **Learn for fun & profit!** Produce color effects on wood, cloth, or paper impossible any other way. Sunfast, wash-proof, too. Kit has GUN; 5 BOTTLES of COLORED INK; STENCIL PAPER; many PATTERNS & DESIGNS; and 22-page TEXTBOOK in full color. Just $2.50 postpaid. CRAFT CATALOG FREE with order. (If W. Va. add 5c Sales Tax)

DWINNELL CRAFT SHOP, Dept. PS85, Elm Grove, Wheeling, W. Va.

AMERICA'S FINEST BUMPER JACK

Here's an *all-around* hydraulic utility jack with hundreds of uses where easy lifting or pulling is required. Safest, quickest, easiest to use on any car built. Result of 15 years of advanced precision engineering. Extra long, heavy duty steel chain with forged steel grab hook picks up loads from 4" BELOW bottom of jack to 22" ABOVE. Base, handle socket, head and chain plate are all tough malleable iron castings. 17" hydraulic lift, 3000 lb. capacity. *Order now at your dealer or send money order or check to*

$15.95 Complete with chain, hook and handle.

© 1948 American Hydraulics, Inc.

American Hydraulics, **Inc.**
SHEBOYGAN, WISCONSIN

American Hydraulics, Inc.
Sheboygan, Wisconsin
Enclosed find check or money order.
Please send.....American Bumper Jacks.
Name.....
Address.....

Copyrighted material

"Fun To See Bass Hit JITTERBUG!"

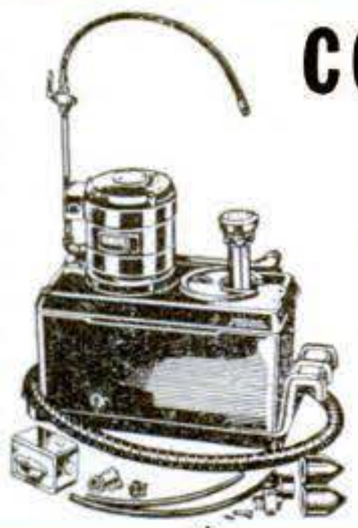
Mike Citrock, Akron, Ohio, angler, says, "It's fun to see bass hit the Jitterbug. Its surface action is so tantalizing they hit it viciously." Mike is shown with his limit catch weighing 13¼ lbs. Beside these, he threw back five smaller bass all caught in 2 hours on the Jitterbug from nearby Mogadore Reservoir.

$1.21 Choice of 7 Colors

Write for catalog

FRED ARBOGAST & CO., INC.

1725 North St., Akron 3, Ohio



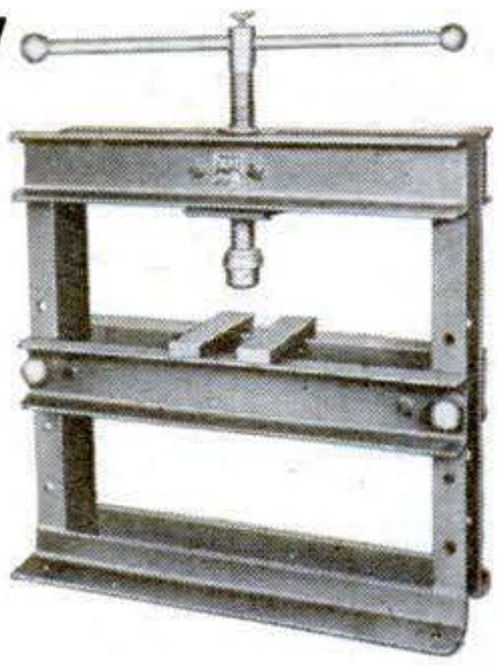
COOLANT PUMP

For metal working lathes and other machine tools. Consists of self-priming pump, tubing, reservoir, mounting tray, motor, switch, and wiring. Reservoir intake fitted with strainer. Write for dimension sheet. Price with ¼ h.p., 1 ph. motor, f.o.b. factory **$103**

SOUTH BEND LATHE WORKS

456A E. Madison St.
South Bend 22, Ind.

Save Time and Money with this Press



Ten-ton press, ideal for all kinds of pressing, separating, straightening, and bending jobs. Ample capacity for home shops. Easily adjustable table takes work up to 18 inches wide and 11½ inches high. Roller-bearing ram for long life. Send for free bulletin showing press and wide variety of accessories.

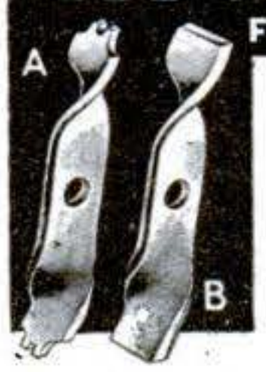
UT-10A Press f.o.b. factory $31.00

DAKE ENGINE COMPANY

622 Seventh Street, Grand Haven, Michigan

USE YOUR BENCH SAW

FOR JOINTING & CUTTING MOULDINGS



With our six inch tool steel cutters make mouldings, casings, drop-leaf tables, grooves beading and jointing. Moulding cutters, A 1 in. wide $1.50. 1½ in. $2.00. Jointing cutters, B 1 in. $1.50. 1½ in. $2.00. E 1 in. for drop-leaf tables, $1.50. E 1½ in. Makes ¾ in. cove & Quarter. $2.00. Postpaid. Guaranteed. State size hole. List & Folder free.

JOHN A. SANDSTROM
Rt. 1-P. Clearwater, Fla.

WOODWORKERS ... Get this

CONSTANTINE MASTER MANUAL

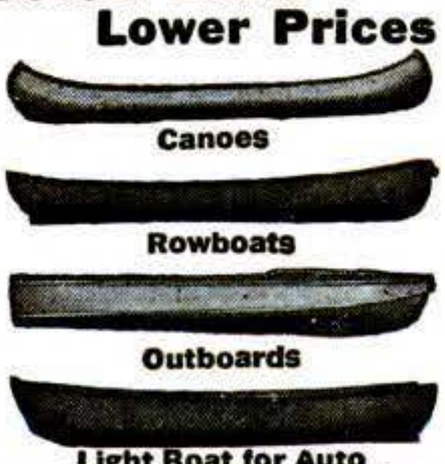
Get the Most Fun From Your Hobby

Indispensable to woodworkers. Newest, biggest edition, more pages, more color, helpful how-to-do-it articles, pre-war and new items, more bargains. Send 25c today and we will include ***FREE! FULL YRS. SUBSCRIPTION*** to Chips and Chats, published bi-monthly. Keeps you up-to-date on everything in woodworking, offers big money-saving bargains. Send now.

ALBERT CONSTANTINE & SON. Inc.
793-A 135th Street, New York 54, N. Y.

Thompson BEATS the World on BOATS

Better Built Lower Prices



Safe Boats With Full Length Spray Rails

Keep passengers perfectly dry—even at high speeds. Catalog also shows two new models of "Take-Along" Boats. Two big factories—save you freight.

CATALOG FREE

Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (151)

219 Ann St. PESHTIGO, WIS. (*Write to either place*) 119 Elm St. CORTLAND, N.Y.

MOTORS-PLANES-CARS-BOATS-MODELS

400 Pictures — 2,000 Model Items

A bible for wide-awake modelers. Model gas engines, planes, boats, cars, rubber-powered planes, jet models, accessories, etc., PLUS articles and stories on building and flying. Send only 10¢, stamps or coins. Also free catalog available.

SPECIAL: U-Control or Free Flight Flying Outfit, complete with motor, plane and over 30 needed accessories.

Only $10 COMPLETE

1/6th h.p. Engines: Thor $9.95; Genie $6.95; Judco $7.25

AMERICA'S HOBBY CENTER, INC. DEPT. S-58 156 WEST 22 ST., N. Y. 11

Copyrighted material

GENSCO
SLOYD KNIVES & WOOD CHISELS

MADE IN SWEDEN

Sweden's toughest charcoal inlaid steel goes into these hand-honed, razor-sharp knives! They're ideal for wood, plastics, linoleum . . . for carving, carpentry, and general shop work. Curly birch, easy-grip handles. 6⅛", 6⅞", and 7 11/16" lengths.

Here's UNBEATABLE tool craftsmanship . . . Swedish charcoal steel tanged-butt wood chisels, individually heat-treated, tempered and honed! Blades have beveled edges for straight chipping and cutting. Curly birch handles. Sizes from ¼" to 2" wide.

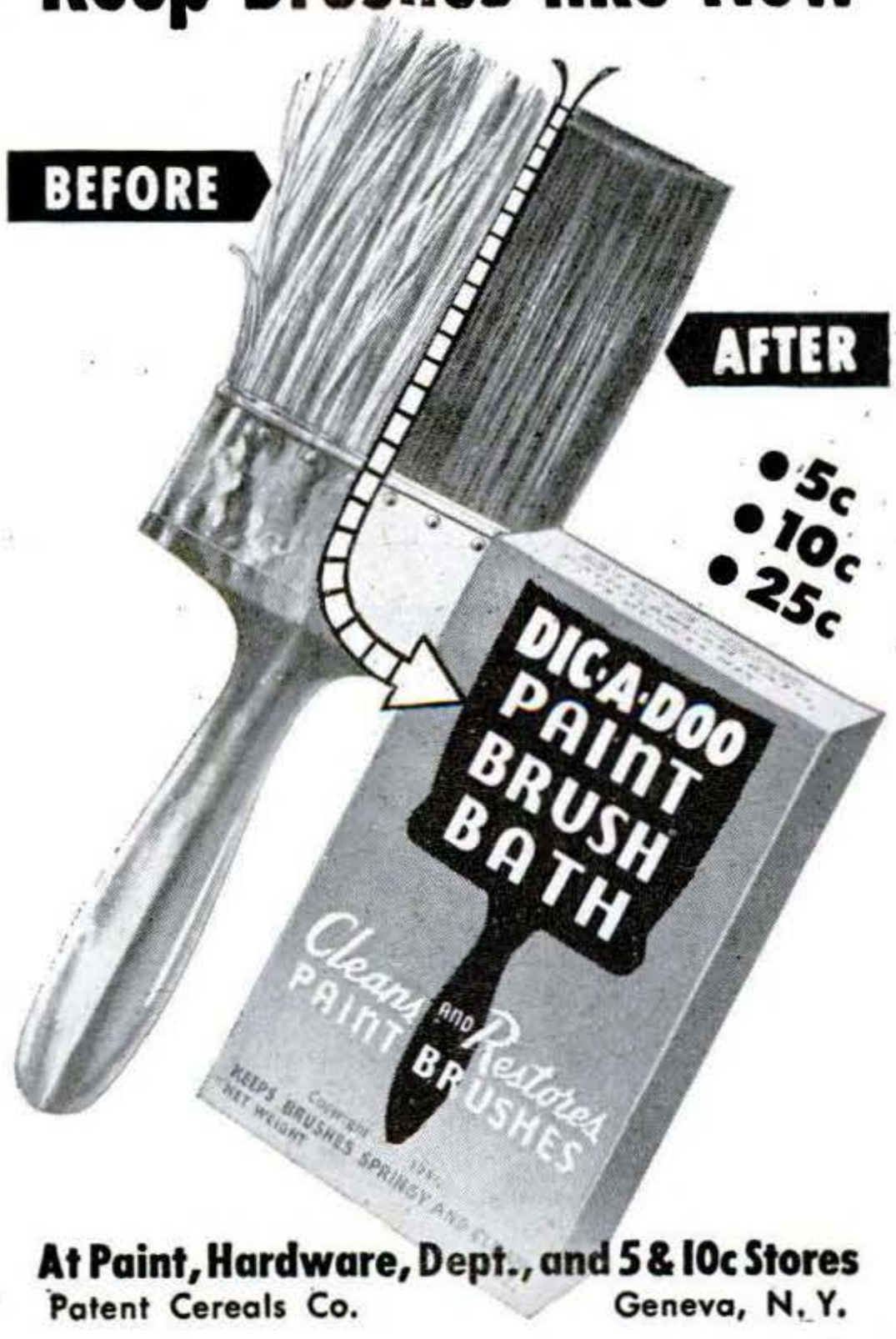
MADE IN SWEDEN

See Your Hardware Dealer or Write:

GENSCO TOOL DIV.

General Steel Warehouse Co., Inc.
1830 N. Kostner Ave., Chicago 39, Ill.

Keep Brushes like New



At Paint, Hardware, Dept., and 5 & 10c Stores
Patent Cereals Co. Geneva, N. Y.

Earn Big Money!
...Arc Welding

You can even "Build Your Own" gas drive portable welder and SAVE $300.00 to $500.00

Small Investment Starts You
in the profitable arc welding business. All you need is a low cost reconditioned auto engine, chassis and Hobart generator to "build your own" portable unit. Easy to build and saves you $300 to $500 over cost of factory built job. Send for FREE instruction book today and get started immediately on the "Big Pay" welding jobs!

Gas Drive Portable

Simplified in Operation
and it's no trouble at all to learn to weld with the Hobart "Simplified" Arc Welder. Practice makes you perfect.

Hobart AC Arc Welders
are ideal for low cost shop operation and you'll want one later on for general shop use. Leaves your portable unit for "Big Pay" outside jobs.

Electric Drive Portable

Hobart School of Welding
can teach you arc welding in a short time at low cost. Individual instructions by expert instructors. Qualified under G.I. Bill of Rights. Check coupon.

20-200 A.C. Welder

Hobart Bros. Co., Box P-58, Troy, O.
"World's largest builder of Arc Welders"

• Yes, send me **free** instruction book on "How to Build Your Own Gas Drive Welder," and information and catalogs on the items I've checked:

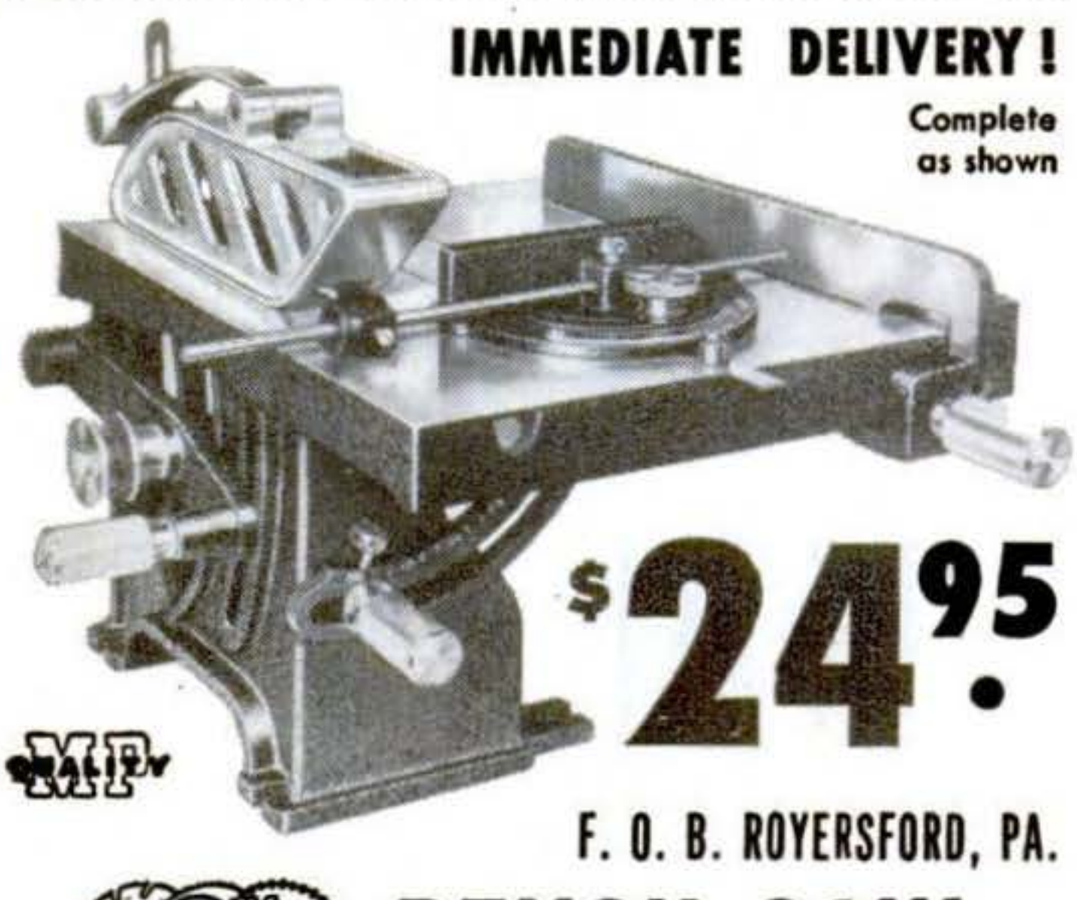
☐ Gas Engine Drive ☐ A.C. Welder
☐ Electric Drive Welder ☐ Welding School

HOBART BROTHERS COMPANY, BOX P-58, TROY, OHIO

Name _____

Address _____

Copyrighted material



F. O. B. ROYERSFORD, PA.

8" BENCH SAW

CUTS THROUGH 2 5/16"

UNCONDITIONALLY GUARANTEED ONE YEAR

Comes complete with Floating motor mount—miter gauge with adjustable stop—aluminum guard—soft aluminum insert—spring steel splitter—heavy gray iron fence—(no motor—no blade). Table 12" x 14". Tilts to 45°—Oilite bearings. Shipping Wt. 48 lbs.

AMERICAN MACHINE & TOOL CO. Inc.

DEPT. 200 ROYERSFORD, PA..

WRITE FOR FREE BOOKLET AND GUARANTEE BOND

RECAPTURE AGAIN...

All Your Greatest Fishing Thrills!

A fisherman's dream come true—all a fine reel can be in quiet operation, instant response to your every cast, faultless performance. Truly *custom-crafted* with 9 better fishing features built in—THE FINEST REEL EVER MADE. This season, recapture again all your greatest fishing thrills—fish with the NEW PRESIDENT! At your sports store.

FREE TACKLE BOOK and Fishing Calendar. Tells how to bait and fly cast. Reels, Rods, Lines, Accessories. Write for yours —SHAKESPEARE COMPANY, Dept. 95, Kalamazoo 2, Michigan.

Shakespeare

FINE FISHING TACKLE HONOR BUILT for FIFTY YEARS

for **AMAZING** *Acceleration*

GET THIS
DIXIE WESTERN
Polished Aluminum
DUAL INTAKE
MANIFOLD
For Fords and Mercurys
increases mileage speed and performance

DIXIE WESTERN MANIFOLD CO.
Dept. S. Box 364, Los Angeles 43, Calif.
Gentlemen Please send me.
☐ Dual Manifold Set
☐ Gas Line and Throttle Kit
☐ Chrome Plated Velocity Stack
to fit my_____
(year and make of car)
☐ Check enclosed ☐ Ship C.O.D.
Name_____
Address_____
City_____ Zone____ State____

DIXIE WESTERN MANIFOLD CO.
Box 364 Los Angeles 43, California

NEW 30" SHEET METAL BRAKE

Forms angles, channels, vees, flanges, locks, zees, boxes. Handles 26 gage sheet steel, heavier gages of aluminum, copper, plastic, etc. Portable. Can be held in a bench vise, or bolted down. All steel construction. Wt. 40 lbs. Shipped exp. collect. ONLY $24.50

12" BRAKE. Cast iron and steel construction. For difficult bends. $14.50 PP.

18" CURVE FORMER. Forms cylinders, round corners and cones in sheet metal and strap iron. Price, $10.00 PP.

VISE IRON BENDER. Forms rings, hooks, eyelets, etc. in 1/2" round or square; 1/4" up to 2" wide in bar iron. Price $10.00 PP. For bending 3/4" pipe, $2.00 extra.

SHEET METAL PLIERS, 2 1/2". Forms angles and channels. $2.00. Sheet Metal and Wire Forming booklet, 50c.

VISE BRAKE MFG. CO., Dept. S5, 1318 So. 30th Ave., Omaha 5, Nebr.

ELECTRICITY *Anywhere*

for HOMES FARMS SHOPS BOATS RADIO USE

● Onan gasoline-engine-driven Electric Plants supply reliable, economical electric service for any use Portable, stationary or stand-by models. Water or air-cooled, compact and rugged.

A.C.: 350 to 35,000 watts in all standard voltages and frequencies. D.C.: 600 to 10,000 watts, 115 and 230 volts. BATTERY CHARGERS: 500 to 3,500 watts; 6, 12, 24, 32 volts.

Write for folder

D. W. ONAN & SONS INC.
2783 Royalston Ave., Minneapolis 5, Minn.

Onan PRODUCTS

Copyrighted material

New Way to Hear Better

Without Risking a Penny!

Send coupon below, receive this amazing hearing aid by mail — no "fitting" needed, no high pressure salesmanship.

So good it can be offered on this

MONEY-BACK TRIAL

Wear your Zenith "75" at home, at work, anywhere. Compare its QUALITY, PERFORMANCE, OPERATING ECONOMY (less than 1c per hour battery cost) with that of ANY other hearing aid. If the Zenith "75" isn't better than you ever dreamed ANY hearing aid could be, return it within 10 days of receipt and Zenith will refund your money in full.

Now—for the first time—you can judge entirely for *yourself* how much a hearing aid can mean in your life! For the new Zenith "75" employs an advanced principle that eliminates the need for "fitting." The correctness of this principle was recently confirmed by U.S. Government-sponsored research at Harvard University.

SAVES YOU OVER $100, TOO! Because the new Zenith "75" comes to you by mail, it saves you embarrassing visits to salesrooms and annoying sales pressure. Also saves you over $100 cash money. If its price had to include "fitting," middlemen's profits and high sales commissions, it would have to sell for $195 instead of $75. So do as tens of thousands have already done. Order your Zenith "75" by mailing the coupon below—right now!

Look only to your doctor for advice on your ears and hearing

ACCEPTED COUNCIL ON PHYSICAL MEDICINE AMERICAN MEDICAL ASSOCIATION

BY THE MAKERS OF THE WORLD-FAMOUS ZENITH RADIOS

ORDER NOW USE THIS COUPON

Zenith Radio Corporation
Hearing Aid Division, Dept. PS58
5801 Dickens Avenue, Chicago 39, Illinois

☐ I enclose check or money order for $75* for one Zenith "75" Hearing Aid. Unless I am completely satisfied and find the Zenith "75" superior to *any* other Hearing aid, I may return it within ten days of receipt and get my money back in full.

**Plus tax of $1.50 in Illinois or New York City; $1.88 in California, except Los Angeles, $2.25.*

☐ Please send me free descriptive literature.

Name.....

Address.....

City.....*State*.....

Copyrighted material

MAY IS NATIONAL NU-ENAMEL MONTH

"Paint-it-Yourself"

$3.45

PAINTS YOUR ENTIRE CAR WITH

ONE COAT COVERS

NU-ENAMEL

TRADE MARK REG. U. S. PAT. OFFICE

NO BRUSH MARKS

PAINT ALL YOUR FENDERS FOR ONLY $1.95

ASK YOUR
NU-ENAMEL
DEALER FOR THIS
INSTRUCTION FOLDER

Contains the step-by-step story of how you can Paint-It-Yourself with Nu-Enamel and get a professional looking job.

It's EASY!-It's FUN!

A PERFECT PAIR!..

THEY BELONG TOGETHER

Your .22 caliber rifle and a Mossberg telescope sight—*there's* a perfect pair for you! They belong together. Users tell us our scopes have doubled their enjoyment of shooting. Targets and objects show up big and clear. You just about *can't* miss!

Mossberg 4-power scopes, with the wonderful Internal Adjustment feature, fit nearly *all* makes of rifles up to .25-.20 caliber. A mighty fine buy at $9.95.

Illustrated: Mossberg Scope Model #5M4. (Rifle is Mossberg Model #42M. $22.95—$23.65 west of Rockies.) Mossberg Scope Model #8M4 is exactly like #5M4 except uses higher mount.

SEE THEM AT YOUR DEALER'S
Send for free descriptive folder—(Sorry, no sales at factory.)

O. F. Mossberg & SONS, INC.

89705 St. John St., New Haven 5, Conn.

NEW CURVED TOOL HOLDER

Fits 1" tool posts! Grind Tool bits! Turns large Discs! Many other uses! See your dealer or send $2.65 direct for complete Kit postpaid.
HURON FACTORY SERVICE CO.
505 Lafayette Bldg. Dept. 4 Detroit, Mich.

Say You Saw It In Popular Science

Your weight does the work with a "YANKEE"

QUICK-RETURN SPIRAL SCREW DRIVER

● Save your wrist: drive and draw screws faster. Just push on a "Yankee" 130A Spiral Driver. Your weight and the spiral turns the screw without blisters or fatigue. Quick-return spring in handle holds blade in slot and returns the handle after every stroke.

★ Write for the "YANKEE" Tool Book ..FREE..

"YANKEE" TOOLS NOW PART OF STANLEY

THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO.
Philadelphia 33, Pa.

Copyrighted material

Here At Last

A Complete Electrode Service for Better, Easier, Faster Welding

P&H Shop Packs — 8 types of electrodes—fill every shop welding need

Eight famous P&H industrial electrodes now conveniently packaged for automotive, general repair, job welding, and machine shops; foundries; schools; etc.

These industrial and commercial arc-welding jobs are easier to do and cost less when you use P&H Welding Electrodes:

- All types of industrial welding
- Sub-contracting work for large manufacturers
- Air conditioning
- Home heating
- Truck body building
- Trailer building
- Automotive repairs { blocks, fenders, frames
- Fuel-oil tanks
- Contractors' welding
- Bridge work
- Construction equipment repairs { excavators, tractors, graders, ditchers, etc.
- Kitchen equipment
- Cabinet work
- Fabricated housing
- Fabricated garages
- Cast iron repairs
- Maintenance work for industrial plants
- Ventilating systems
- Bicycle repairs
- Stainless steel bar equipment
- Ornamental iron work
- Fabricating equipment of your own design

You save welding time and do better work, when you always have the right electrode for the job.

P&H Shop Packs consist of eight different packages of electrodes. Detailed instructions are printed on each individual package so that you can use the right electrode for every job.

Guesswork is eliminated. Welds are stronger, better looking. Welding time is greatly reduced.

And you can weld anything made of steel, alloy or stainless steel, sheet metal, cast iron. You can also put hard, protective, long-life surfaces on new parts, or build up worn parts better than new. P&H Shop Pack electrodes let you do a wider variety of work — at lower cost.

Attractive Price

The cost of all 8 Shop Packs, individually packaged and labeled for your convenience, is only $11.75.

Simplifies Inventory

The use of individual packages means that you only have to reorder the types you need — at little cost. Maintaining a complete range is easy. You can always handle any job that comes up.

Can be used on any type of welder

It pays to use P&H packaged electrodes. No matter what make of welder you have, no matter whether you use AC or DC current, order P&H Shop Packs today from your nearby P&H distributor.

Reduces Welding Costs

Purchase P&H Shop Pack electrodes ($11.75). Check their speed, quality, easy manipulation, and wide variety of uses. This small investment paves the way to lower welding costs. You will want to standardize on these efficient weld rods.

As a further aid to reducing costs, we suggest that you investigate the new P&H AC Arc Welder. **This is the only welder with easy-to-use Dial-lectric control.** It has no moving parts and needs no maintenance.

Connectible to 220 or 440 volt current, the P&H Dial-lectric machine requires only 2¼ feet of floor space. Built-in remote control; easy, quick-start arc; high-low welding range; elimination of arc blow; and the simple radio-like knob that provides complete welding range from 20 to 275 amps with a ¾ turn — all these features make for better, faster welding.

Contact your nearby P&H distributor for complete details about America's most complete welding service, or mail the coupon below, clipped to your business letterhead.

P&H
WELDING ELECTRODES
4674 W. National Ave.
Milwaukee 14, Wisconsin
HARNISCHFEGER CORPORATION

Manufacturers of
America's Most Complete Welding Service

TEAR OUT COUPON, ATTACH TO YOUR BUSINESS LETTERHEAD, AND MAIL TODAY

HARNISCHFEGER CORPORATION
4674 W. National Avenue, Milwaukee 14, Wisconsin

Yes, I'm interested in Shop Packs, P&H's complete electrode service, and the new P&H AC Arc Welder with revolutionary Dial-lectric control. I would like information on the items that I have checked below:

☐ P&H AC Welders ☐ Send address of distributor
☐ P&H Shop Pack Electrodes ☐ Send representative
☐ Send Free Book, "Simplified Welding."

Name_____
Position_____ Company_____
Address_____ ☐ Home ☐ Business
City_____ (___) State_____

Copyrighted material

NEW MILANO

IMPORTED BRIAR with "LOCKMOUNT"

Famous Milano pipe with added feature ...*Lockmount* Hesson Guard. It *screws* into bowl for tighter, firmer fit. Stops goo! Mister, if you want a pipe that always stays clean and dry, get a Milano!

WDC

$1.50
IMPORTED BRIAR

WM. DEMUTH & CO., INC., NEW YORK 22

WHIPS THE DARK!

800 foot spot, or handy floodlight. Dozens of uses! Stands, hangs at any angle. 80-100 hrs. on 6-volt battery. A genuine Delta. At hdwe., sport, elec. stores. Less battery **$4.25**

Delta ELECTRIC CO.
MARION, INDIANA

POWER*lite* 2-LITE ELECTRIC LANTERN

Carbide Tipped Centers

Essential for metal working lathes where high speeds or extreme cutting pressures are encountered. Tungsten carbide tip will withstand more wear than any other metal. Entire center precision ground.

No. 2 Morse Taper . . . . postpaid $4.50
No. 3 Morse Taper . . . postpaid $8.00

SOUTH BEND LATHE WORKS
456A E. Madison St.
South Bend 22, Ind.

BUILD YOUR OWN POWER LAWN MOWER

WHY BREAK YOUR BACK MOWING FIELD OR LAWN?

WRITE FOR **FREE** LITERATURE
The Rite-Way Mower Attachment ▶
Ball Bearing

SAVE MONEY
SAVE TIME

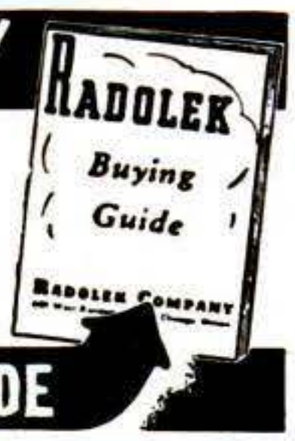
Now anyone can save time and effort mowing field or lawn by building their own whirl type power mower. Build according to your own ideas and needs at small cost. Cut close to fences, walks, buildings, etc. Build in short time with parts and instructions we furnish. Save hours of time and back breaking labor. Write today for FREE information.

T & H MFG. CO., Dept. M-115
811 E. 31, Kan. City 3, Mo.

Everything in Radio!

Make **Radolek** your buying headquarters for Radio-Electronic repair and replacement needs. Large stocks assure finest, most complete selections of all available items at lowest prices. Your orders receive special attention for fastest delivery. Send today for FREE **Radolek Buying Guide.**

RADOLEK CO., Dept. A-058, 601 W. Randolph St., Chicago 6, Ill.



FREE RADIO BUYING GUIDE

Say You Saw
It In Popular Science

PAINTERS' *STRIPING* TOOL

A TOOL... NOT A BRUSH

NEW, IMPROVED

Modern—streamlined—fits the hand like a fountain pen! Easy to use as a pencil. Draws parallel lines—straight, curve or circular. Does expert job on autos, furniture, toys, bikes, model planes, signs, bulletins, linoleum. (Makes wall board look like tile.) Every painter and craftsman needs one! Type "M" MASTER Painters' Striping Tool complete with tip for 1/16" stripe, $1.00. Extra tips 1/64", 1/32", 3/64", 1/16", 5/64", 3/32", 1/8"—75c each. Tool with complete set of 7 tips $5.00. (C.O.D. orders 25c extra.) Paint dealers, write!

$1.00 POST PAID

EASY AS USING A PENCIL!

WENDELL MFG. CO.
4234-A Lincoln Ave., Chicago 18, Illinois

Copyrighted material

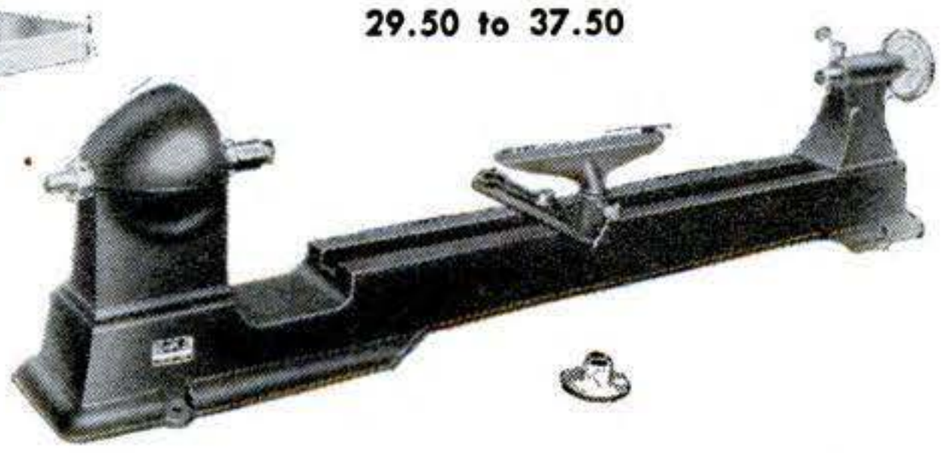
THE foster LINE

TRADE MARK

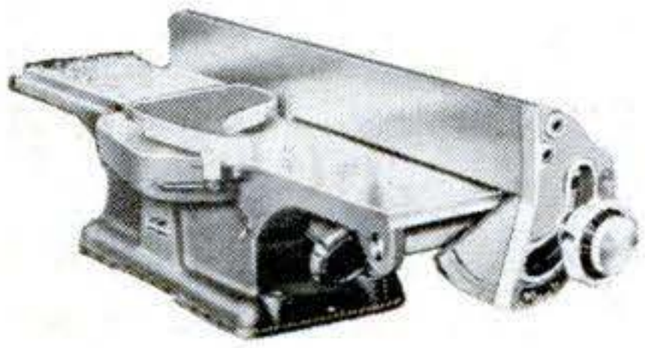
POWER TOOLS

8" TILTING TABLE SAWS
44.95 to 75.00

9-12" LATHES
29.50 to 37.50



18" JIG SAWS
39.95



4" JOINTERS
39.95

DOLLAR FOR DOLLAR
TOOL FOR TOOL

THE foster LINE

LEADS THE FIELD

SPINDLE SHAPERS
29.95 to 99.50

12-14"
BAND SAWS
69.95 to 84.50

Make your selection from this broad line. You'll find just the right Foster Power Tools to fill your needs.

Built to serve home, farm and industry Foster Power Tools have all the latest design and construction features.

12"
DRILL PRESSES
49.50

33 fine tools

FROM WHICH TO CHOOSE

• 10x2¾" THICKNESS PLANERS	$119.50
• 12¾x4" THICKNESS PLANERS	230.00
• 12" TILTING ARBOR SAWS	147.50
• 8" RADIAL ARM SAWS	119.50
• DRUM AND DISC SANDERS	29.95
• 12" WOOD TURNING CHISELS-set of 6	6.95
• 17" WOOD TURNING CHISELS-set of 8	12.50

CIRCULAR SAW BLADES — DADO HEADS
SHAPER HEADS AND KNIVES

SEE THEM NOW AT
YOUR FRIENDLY FOSTER DEALER

FOR FREE CATALOG SHEETS
SEE YOUR DEALER OR WRITE DIRECT

foster manufacturing co.

3 KINSEY AVE, BUFFALO 17, N. Y.

Copyrighted material

HIGH POWER PRISM

BINOCULARS

Made In Germany
Seized for Reparations

$35

Finest Optics
Feather Weight
Center Focus
Wide Angle

Made in Germany by one of the world's outstanding manufacturers of precision binoculars (name withheld) and seized for war reparations. When these are gone, you will pay several times as much for the same glasses. They are brand new and perfect. Ultra-precise optics, sealed against moisture and dust. Center wheel focussing with individual eye compensation. Lightweight aluminum alloy frames, as rigid as steel, yet the lightest weight made. Recommended as an all around glass for sports, hunting, outdoors, bird study or where higher magnification and longer range are desired. It outperforms the big U. S. Navy 7x50 binoculars both in power (8 power as compared to 7 power) and in angular field of view (54 degrees as compared to 51 degrees)—yet it weighs only one-third as much. Sold with a guarantee of complete satisfaction or money refunded. Quantity limited so don't delay!

SPECIFICATIONS

Model	Power	Weight	Price without case	Price With Leather Case
8x30	8	14 oz.	$35.00*	$39.50*

*Plus 20% Federal Tax

IMMEDIATE DELIVERY WE PAY THE SHIPPING COST

BROWNSCOPE CO.

Dept. 5P, 24 West 45th St., New York 19, N. Y.

32 DRAWER UNIT $4.95

64 DRAWER $8.95

for home or shop

THE JIFFY *metal* CABINET

With Laminated Fibre Board Drawers

THE HANDY WAY TO KEEP SMALL PARTS, WASHERS, NAILS, SCREWS, NUTS, BOLTS AT HAND

Approximate
DRAWER SIZE
1¼" Deep
3" Wide
6" Long

CABINET SIZE
32 Drawer Unit
6" Deep
12¾" Wide
15¼" High
Shipping Weight approx. 9 lbs.

64 Drawer Unit
6" Deep
25½" Wide
15¼" High
Shipping Weight approx. 18 lbs.

For small items, the low-cost Jiffy Cabinet, 32 or 64 drawer units that put office, shop, work bench, household and hobbyist needs at your fingertips. Metal flange drawer guides. Spot welded metal cabinet with laminated fiberboard drawers insures long time-saving service. Why fumble? With the Jiffy you know where it is. 32 drawer unit—$4.95; 64 drawer unit—$8.95. Send check or money order—No C.O.D.'s please. Ohio orders please add 3% Sales Tax. Shipping charges Parcel Post Collect.

KAYTEE PRODUCTS
Dept. S • Box 588 • Canton, Ohio

Free Booklet Helps
HARD of HEARING!

If you're interested in better hearing, you'll want this valuable free booklet, "Modern Science and Your Hearing." Prepared with the help of scientists at Bell Telephone Laboratories, it is published by Western Electric. Already, about 100,000 copies have been distributed!

It's fully illustrated, informative yet easy to read and understand. It tells you how hearing loss occurs, what science can do to correct this condition. Send today for your copy of this comforting and helpful booklet, before the supply is exhausted.

FREE! *USE THIS COUPON*

WESTERN ELECTRIC Dept. 380-PS5
195 Broadway, New York 7, N. Y.

Send free copy of "Modern Science and Your Hearing." Also booklet on two new *all-in-one* Western Electric Hearing Aids.

Name_____

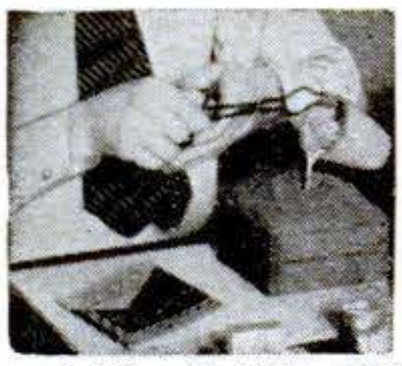
Address_____

City_____ State_____

Distributed in U. S. A. by Graybar Electric Co.; in Canada by Northern Electric Co. Ltd.; in other countries by Westrex Corp.

Sand Casting—Forging—Heat Treating—Case Hardening

BRONZE FOUNDRY



In your own workshop allows you to design and build your own GASOLINE ENGINES, STEAM ENGINES, STATUARY, ART OBJECTS, SPECIAL TOOLS, NEW INVENTIONS, ETC. You can also make forgings and case harden steel. Your shop is not complete without a FOUNDRYETTE. Three sizes are available capable of making bronze castings of 1½, 3 and 6 pounds weight, aluminum, copper, brass, etc., $22.50, $29.50, $42.00 f.o.b. Kansas City. Domestic gas supply and 110 volt AC or DC energy required for operation. Write for circular.

KANSAS CITY SPECIALTIES CO.
Box 6022, Dept. S-4 Kansas City, Mo.

GEIGER COUNTER TX-5

FOR PROSPECTING RADIOACTIVE MINERALS.

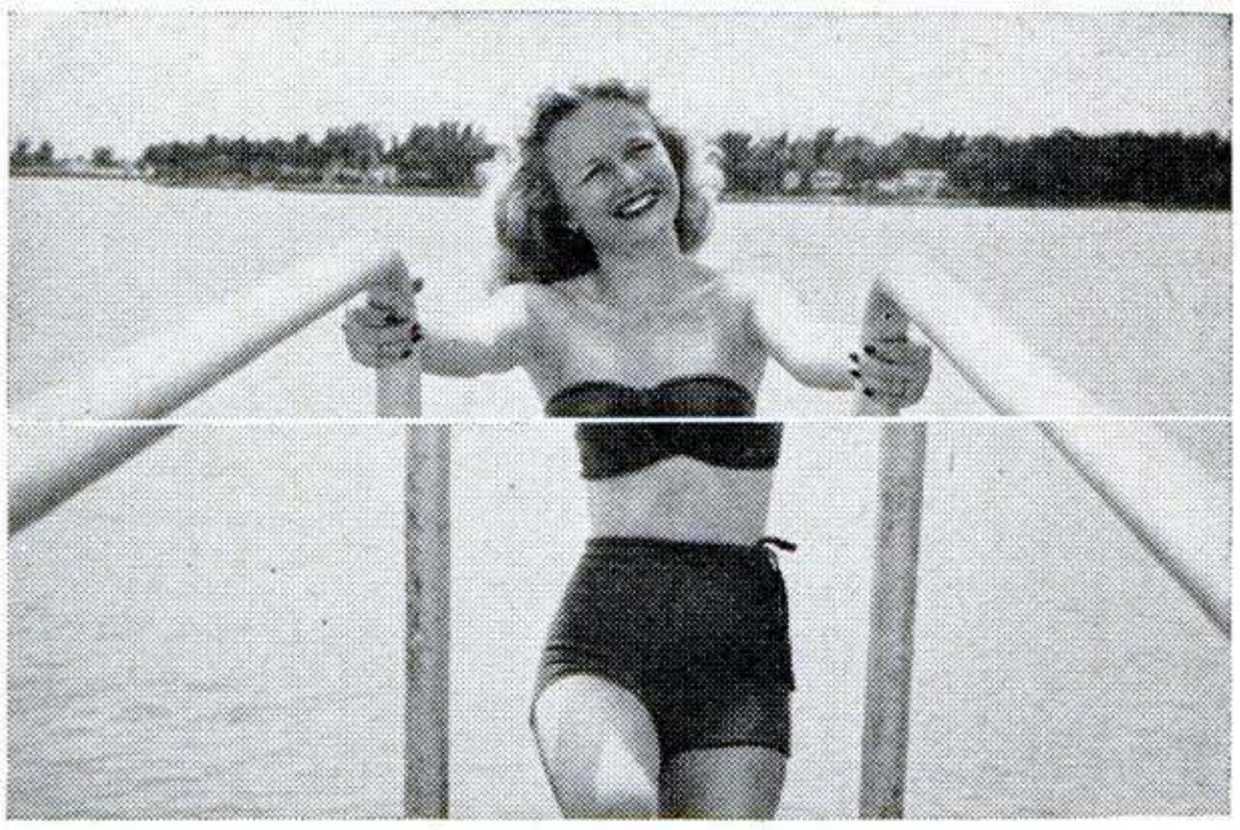
The TX-5 Geiger Counter is expressly built light and strong for locating deposits of radioactive ores. Write for information telling how this unit or other units may be used to help you and your industry. The TX-5 is extra portable, battery operated and extremely sensitive to radioactive rays. Address Dept. PS

Shipped Same Day

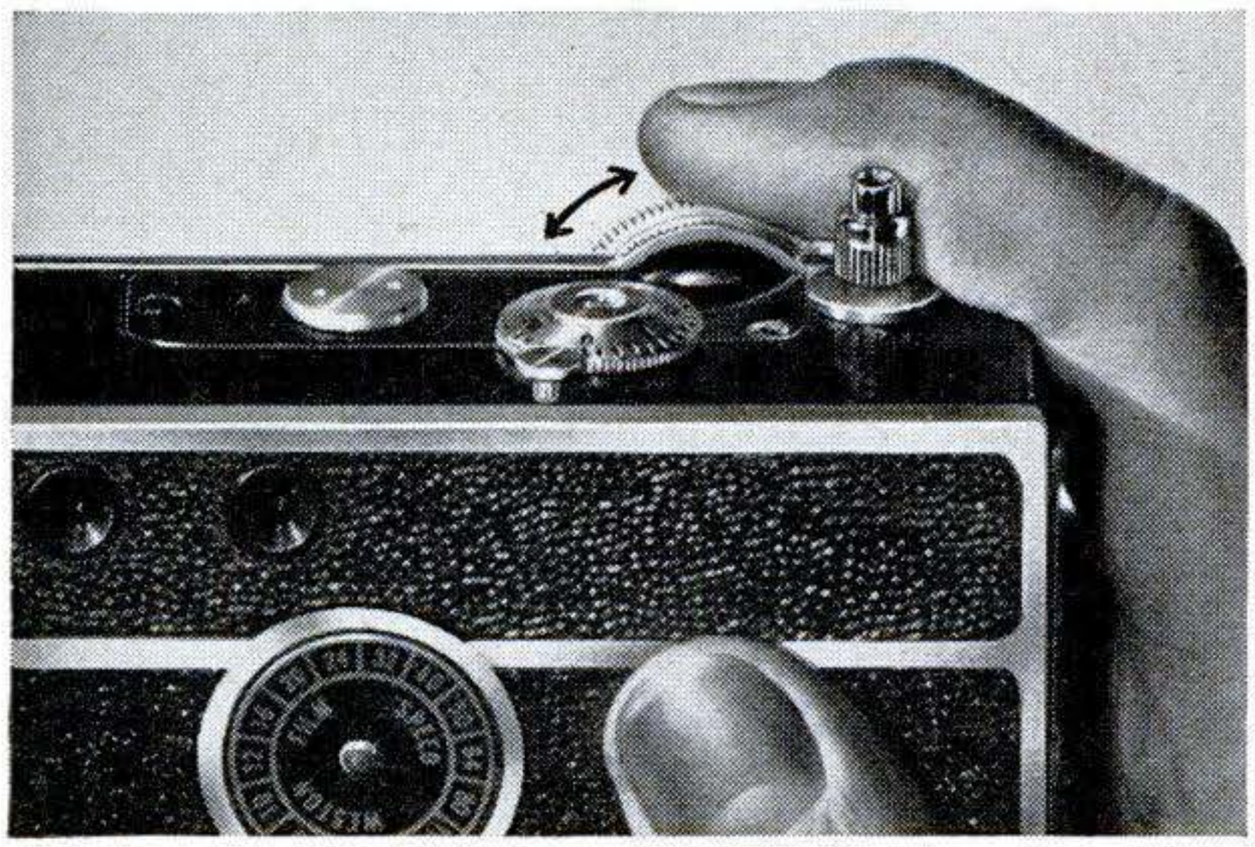
OMAHA SCIENTIFIC SUPPLY CORP.
3623 LAKE ST. OMAHA 4, NEBRASKA

Copyrighted material

Argus C-3 gets the Range ..you get the Picture!



First you look through rangefinder. Split image means you're out of focus.



Then you turn focusing knob to get image sharp.

ARGUS CAMERA PHOTO

Here's your finished print, clearly in pin-point focus.

Coupled Split-Field Rangefinder pre-focuses every shot

This split-field rangefinder is but one way Argus C-3 helps you get better pictures. There are others. Like the F3.5 Anastigmat Cintar lens; the synchronized flash attachment.

Lens is hard-coated to eliminate flare and "ghosts". Exceptionally sharp for finest detail. Color-corrected? Naturally!

Argus C-3 flash attachment is simple plug-in type. Readies you in an instant for night or indoor work. Yes, your Argus C-3 does have everything you need for most every kind of shot. Ask your Argus dealer today! For good picture-taking information get 48-page booklet titled, "Good Pictures". Send 25¢ to: Advtg. Manager, Argus, Inc., Ann Arbor, Michigan.

ARGUS, INC. • ANN ARBOR, MICHIGAN

OTHER C-3 FEATURES
Takes economical 35mm. film. 36 exposures on a single roll. Accurate shutter speeds from 1/10 to 1/300. Handsome, saddle-leather carrying case.

argus

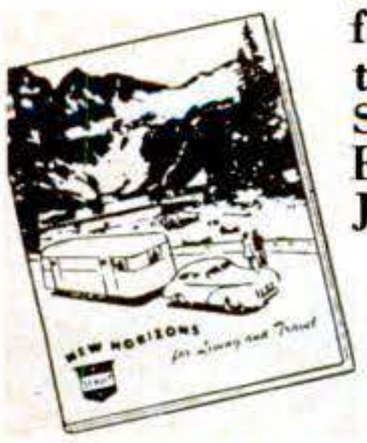
America's Favorite 35 mm. Flash Camera

Copyrighted material

Take a Schult
FOR TRAVEL-LIVING

COMFORT and ECONOMY

● Here is outstanding VALUE! One modest investment, in a Schult, buys a complete, equipped home, ever ready to follow your car easily at regular driving speeds. Schult offers dozens of *plus-values* that cost you nothing, but add to your satisfaction. Ask your Schult dealer to show you 1948 models or write Schult Corporation, Dept. 3105, Elkhart, Indiana. *In Canada:* John Inglis Co., Ltd., Toronto.



FREE
Write today for book with full details of the new 1948 Schult models.

SCHULT *Trailer Coaches*

*SELSYN UNITS

(For use with Remote Weather Vane Indicator as described in POPULAR SCIENCE, p. 180, March 1948.)

*Remote position indicator with an infinite variety of applications. Remote unit will indicate accurately the position of the rotor of the transmitting unit at any distance. Can also be used for light mechanical remote control applications.

Brand new units, manufactured by General Electric 2¼" dia. by 3½" long with 6/40 threaded shaft. Operate 35-40 volts A-C/60 cycles with transformer or with 60 watt light bulb or capacitor (greater economy and less heat) on standard 115 volt/60 cycle house line. Complete instructions.

STOCK NO. SEL-50 ..... **$3.95** Pair

***CAPACITOR** for operation on 115 V/60 cycle line (Stock CPO-48) ..... **$.53** ea.

Mail orders please include 30c per pair east of the Rockies, 50c west, for postage and handling.

DUBIN ELECTRONICS CO., INC., Dept. S
103-02 Northern Blvd., Corona, N. Y.
Tel. HI 6-3066 • Send postcard for bulletins on "surplus" electronic equipt.

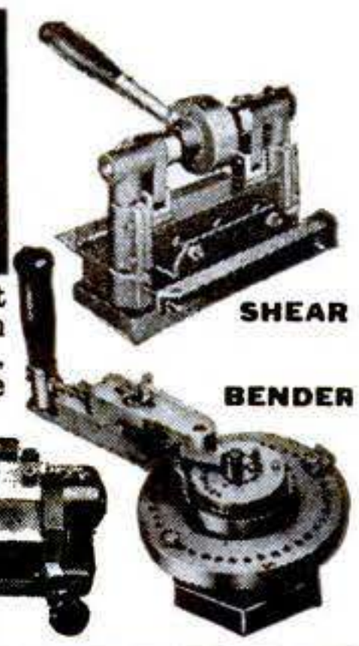
ONE-MAN SAWMILL LESS THAN $200.00
Easy To Turn Trees Into Money

Makes Lumber ties, shingles, crates, lath, studding.

BELSAW MODELS in 10 to 24 foot sawing lengths. **MECHANICAL FEED,** accurate set works and positive dogs. Use tractor or old auto engine for low cost power. Thousands used for commercial sawing. Pays for itself quickly. Send post card today for FREE booklet, "How To Make Lumber" and Catalog of Woodworking Equipment.

BELSAW MACHINERY COMPANY
2846-P Field Bldg., 315 Westport Rd., Kansas City 2, Mo.

DIE-LESS DUPLICATING

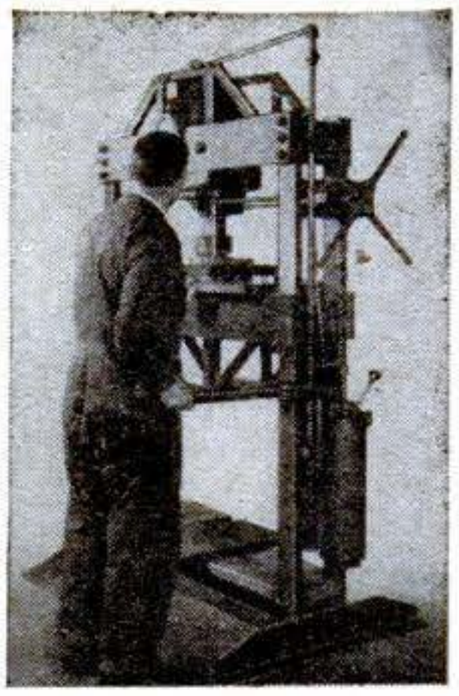


Many small parts can be formed without dies, to duplicated accuracy of .001" with DI-ACRO Precision Machines, — Benders, Brakes, Shears. Save die expense and time delay. Ideal for experimental and research work, making samples, models, etc. as well as regular production runs. Write for descriptive literature.

O'NEIL-IRWIN MFG. COMPANY
342 8th Ave., Lake City, Minn.

WRITE FOR YOUR FREE *COPY OF THE NEW*
KRW HYDRAULIC PRESS BOOK

Describes all manner of Production and Shop Work on KRW Hydraulic and Bench Type Arbor Presses. 32 pages illustrating the new KRW Hand-operated, Electric-operated and Air-operated Hydraulic Presses. ***Write for your copy today.***



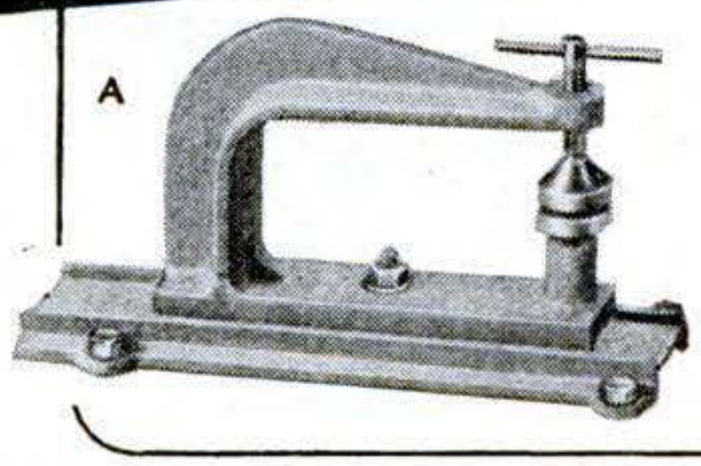
K. R. WILSON, DEPT. 54, 215 MAIN ST., BUFFALO 3, N. Y.

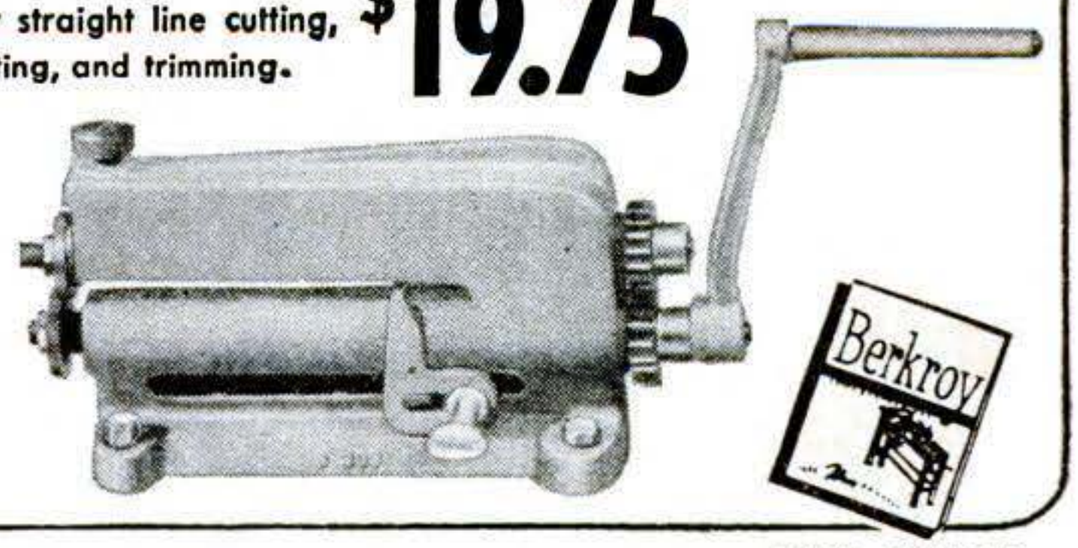
Copyrighted material

Berkroy.. Metal Shear

For straight line cutting, slitting, and trimming. **$19.75**

With Clamping Head, for cutting inside and outside circles (A) extra. **$7.50**

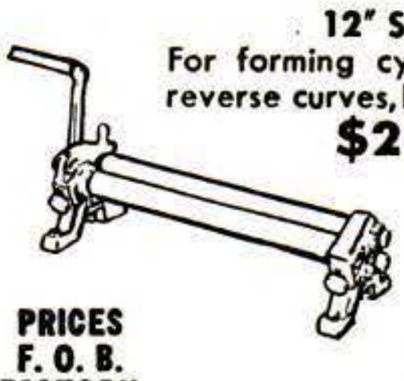




FREE FOLDER
Contains Complete Specifications and Prices on Berkroy Metal Tools.

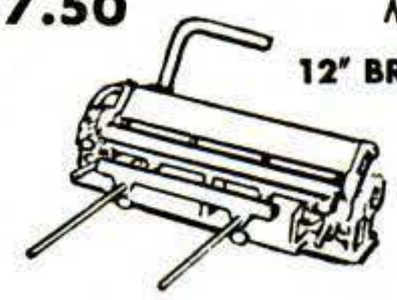
A handy professional type tool that easily cuts 20 gauge sheet steel and heavier gauges in softer metals. Cutters are adjustable for various gauges. Ideal for straight cutting, slitting and trimming. Adjustable arm controls width of strip up to 6". With clamping head will cut circles up to 12" in diameter. Rigid gray iron frame, heavily ribbed and completely machined. Can be bolted to bench. Shear has 1¼" Hardened and Tempered Cutters.

12" SLIP-ROLL
For forming cylinders, scrolls and reverse curves, heavily constructed.
$27.50

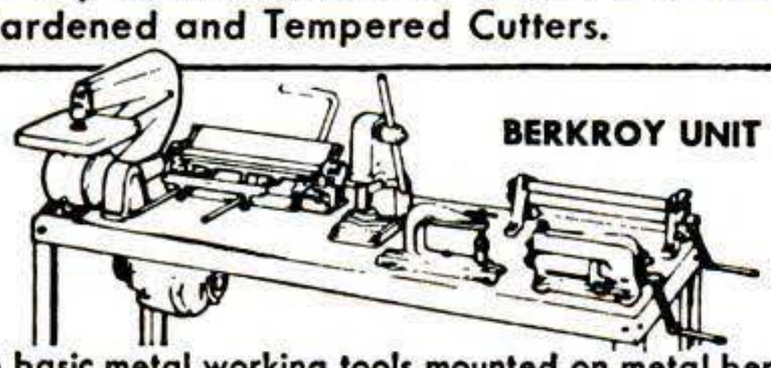


PRICES F. O. B. FACTORY

12" BRAKE



Forms flanges, boxes, tabs. Adjustable arm positions work for repeat operations. Works sheet steel up to 20 gauge. Heavier gauges in softer metals. Completely machined.. **$43.95**



BERKROY UNIT

Five basic metal working tools mounted on metal bench: Nibbler, 12" Brake, 12" Shear with Clamping Head Accessory, 12" Slip-Roll and Hand Punch. Ideal for schools, shops, inventors and experimental work **$217.50**

Other Berkroy Metal Working Tools
Nibbler, less motor.....**$49.50**
Hand Punch **$27.50**

BERKROY PRODUCTS, INC.

Dept. E, 336 Magnolia Street, Oakland 7, California

DISTRICT OFFICES
Woolworth Bldg. New York 7, N. Y. CO 7-8024
550 W. Washington Blvd. Chicago 6, Illinois Central 1246
1672 Mission Street San Francisco, Calif. Underhill 6682
700 Commerce St. Dallas 2, Texas Central 4075

NOW! BUILD 15 RADIOS $14.75

COMPLETE KIT ONLY...

Absolutely no Knowledge of Radio Necessary
You Need NO Additional Parts

THE PROGRESSIVE RADIO KIT is THE ONLY COMPLETE KIT. Contains everything you need. Instruction Book, Metal Chassis, Tubes, Condensers, Resistors and all Radio parts.

The 36-Page Book written by Expert Radio Instructors teaches you to build radios in a Professional Manner. You start with a 1-tube receiver. Before you are done with this kit, you will have built 11 Receivers, 1 Public Address System and 3 Transmitters.

SPECIAL FREE OFFER!

Electrical and Radio Tester sent absolutely FREE with each Progressive Radio Kit. PLUS FREE membership in Progressive Radio Club. Entitles you to free expert advice and consultation service with licensed radio technicians.

Write for further information, or ORDER your KIT NOW! ONLY.....**$14.75**

BUILD A 5 TUBE AMPLIFIER—*only* $9.75

Ideal for phonograph, FM tuner or microphone. Has 5 tubes including rectifier. Kit is complete with tubes, chassis, volume control, tone control, radio parts, hook-up wire, solder and instructions. We can provide a 4-inch PM speaker with mounted output transformer to fit on chassis, priced at $1.95. Or use this kit with your own speaker. It has 5 watts output, more than enough to drive a 12-inch speaker.

Postage prepaid with check or money order.
(Postage not prepaid with C.O.D. orders)

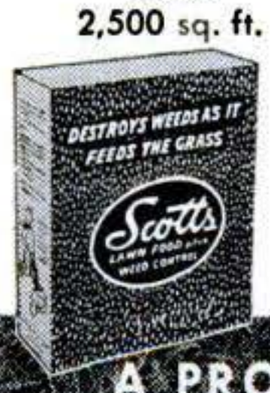
PROGRESSIVE ELECTRONICS CO., Dept. 96
497 Union Avenue Brooklyn 11, N. Y.

For a Greener Lawn Without Weeds use

Scotts

LAWN FOOD *plus* WEED CONTROL

EASY TO APPLY
Regular Package treats 2,500 sq. ft.



Just one application will transform your lawn to a carpet of weed free grass and make it sparkling green too! Try this easy **Scott** treatment. **Scotts** Lawn Care Products are available from coast to coast.

O M Scott & SONS CO.
123 Spring Street, Marysville, Ohio

A PROVEN Scotts PRODUCT

Copyrighted material

A YEAR 'ROUND *Labor Saver*

CHOREMASTER

for

CULTIVATING
PLOWING
GRASS CUTTING
WEED CUTTING
SNOW PLOWING

and dozens of other uses . . .

$146.50
Plus freight

Do your gardening, grass cutting, cultivating or snow plowing, yet add to your leisure and comfort. Save hours and aches with the New CHOREMASTER on your garden, lawn, farm or suburban estate. This rugged tractor zips through tasks formerly taking hours of backbreaking labor. The finest value money can buy. Send for attractive folder showing attachments, applications, and nearest dealer's name.

CHOREMASTER

Made by Special Products Division
The LODGE & SHIPLEY *Co.*
816-5 Evans St., Cincinnati 4, Ohio

There's never been anything to compare to these

BINOCULARS

They look like fine imported binoculars! They bring things close-up and clear! They're adjustable for pupilary distance! They're adjustable for individual focus! Body of tough durable plastic with convenient shoulder strap. Ideal for sport events, Theater, scouting, etc. In short here is the binocular buy of the decade. C.O.D. only $2.50 plus postage or send $2.50 and save postage. Your money back if not satisfied.

NOT A TOY

THRIFT MERCHANDISE CO., Dept. A
307 Fifth Ave., New York 4, N. Y.

U. S. NAVY 7x50
PRISM BINOCULARS
with Coated Optics

Used but in EXCELLENT CONDITION

$95.00

Complete with leather carrying case and sling

Universal, 6 x 30 Navy Prism Binoculars, used but in excellent condition, complete with leather case and sling straps **$42.50**

With Coated Optics, $10 Extra.

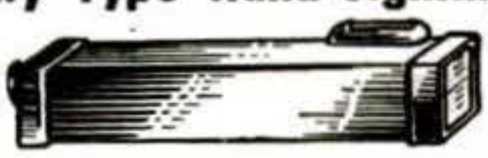
WHEATSTONE BRIDGES

Portable. Used, in excellent condition. Manufactured by Thompson Lever Mfg. Co., Philadelphia. Value $150.00 **Special** **$94.50**

Field Glass, 4 x 40 Wollensak. Ideal for bird study. **Brand New** **$17.95**

Engineers All Metal Army Type Hand-Sighting LEVELS

$2.00 ***PRECISION QUALITY***



Send $1.50 for 3rd Edition of Gun Digest with our complete catalog of new and used guns, etc. Our separate catalog 25c.

PUBLIC SPORT SHOPS
11 S. 16th St., Phila. 2, Pa. **No COD's**

WHEELS

Semi-Pneumatic with Firestone Tires: 8 x 2 –$2.00, 10 x 1.75–$2.25. Industrial with B. F. Goodrich Heavy Duty Tires: 10 x 2.75 –$4.95. Pneumatic with B. F. Goodrich or Schenuit Tires and Tubes: 400 x 8–$12.50. With hi-speed Timken Roller Bearings– **$17.50 Post Paid.** Send Check or Money Order–No C.O.D. or Stamps. Complete line of Wheels and Casters–Send for Free Catalog.

GREAT LAKES WHEEL CO. P. O. BOX 1501 Milwaukee, Wis.

LAW

STUDY AT HOME for Personal Success and LARGER EARNINGS. 39 years expert instruction—over 108,000 students enrolled. LL.B. Degree awarded. All text material furnished. Easy payment plan. Send for FREE BOOK NOW—"Law and Executive Guidance."

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 89PS 646 N. Michigan Ave. Chicago 11, Ill.

SAVE MONEY
build your own
SMITH COMPRESSOR

Now, use the world-famous Smith Air Compressor to operate rock drills, paving breakers, spray guns, sandblasting, etc., at low cost! Just order the Smith Compressor Head and Accessories with complete instructions for assembling. All you need is a Ford Motor and shop facilities. Capacity 60 cu. ft.—ample power for most compressor jobs. Pressure up to 100 lbs. per square inch. Head equipped with high speed compressor valves; automatic unloading and idling.

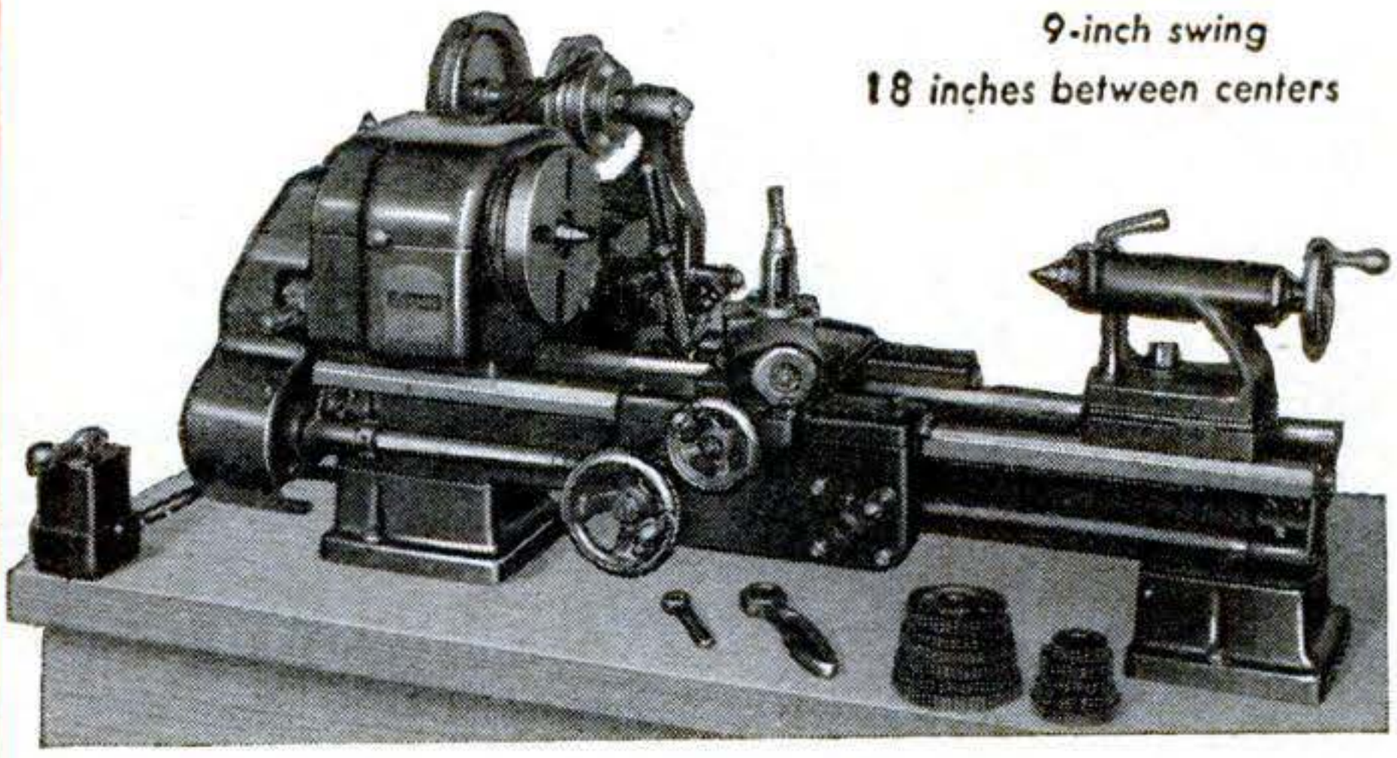
WRITE TODAY! **GORDON SMITH & CO., Inc.**
405 College Street Bowling Green, Ky.

Copyrighted material

A NAME TO REMEMBER WHEN YOU THINK OF **BETTER** LATHES AND SHAPERS

Logan

ACCURACY IN A 9-INCH SWING



9-inch swing
18 inches between centers

Plus Logan speed, ruggedness and versatility at $159.50

• This lathe will produce precision results on any job you give it, and it retains its accuracy through years of use. Bed ways precision ground to within .0005" of parallelism. Ball bearing spindle needs no bearing adjustment from 30 to 1450 rpm. In brief, it is a LOGAN Lathe built in a compact 9-inch size. See it at your Logan dealer's, or write for information.

DISTRICT OFFICES

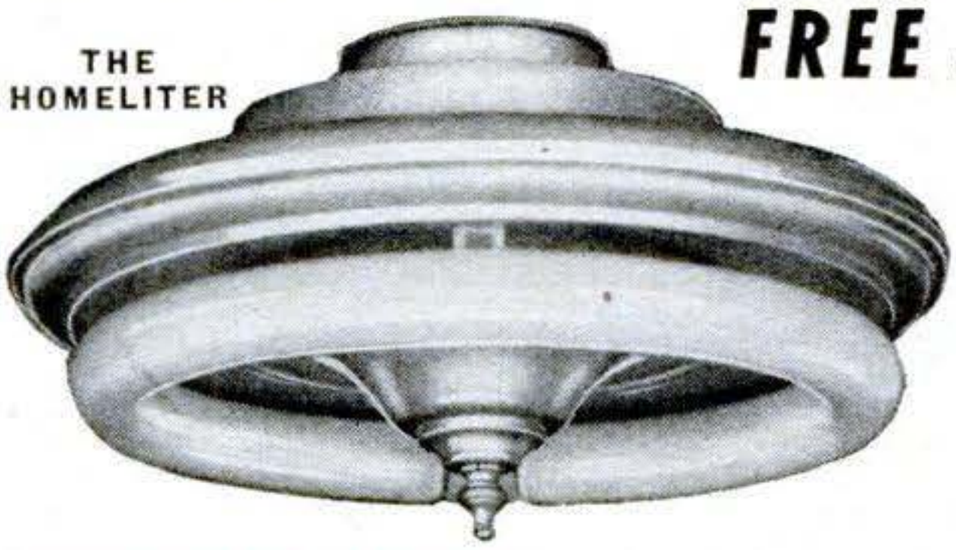
Woolworth Bldg.	550 W. Washington Blvd.	1672 Mission Street	700 Commerce St.
New York 7, N. Y	Chicago 6, Illinois	San Francisco, Calif.	Dallas 2, Texas
CO 7-8024	Central 1246	Underhill 6682	Central 4075

LOGAN ENGINEERING CO., Dept. CC-5 CHICAGO 30, ILLINOIS

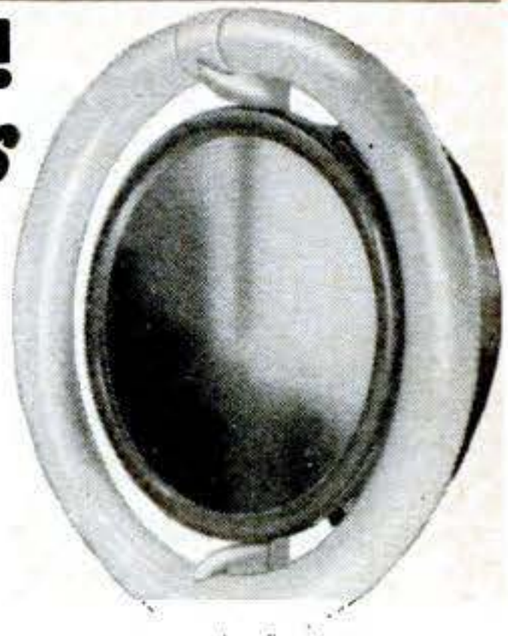
22 Big Money-Makers in a Single Line!

Amazing New Fluorescent Lights with *CIRCULAR TUBES*

THE HOMELITER

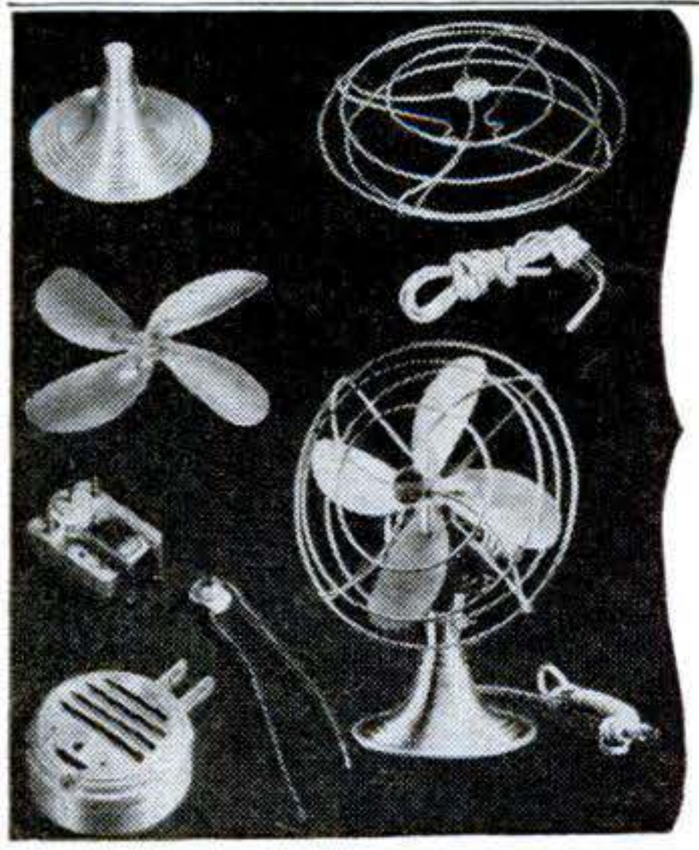


FREE SALES OUTFIT • Don't send a penny. Sample Outfit is FREE. Rush name on penny post card for money-making facts about sensational new "CIRCLINE" Fluorescents. Latest scientific development gives you **22** new type circular tube fixtures for kitchens, dinettes, halls, and play rooms. Also Floor and Table lamp for living rooms and pin-ups for shaving and vanity tables. Sells on sight to homes, restaurants, stores, offices. No other fluorescents like CIRCLINE. Salesmen who order samples quickly reorder in large quantities. **All fixtures complete with tubes.** No waiting. Also **immediate delivery** on all standard type Fluorescent Fixtures. This is too good to miss. Big, quick profits waiting. Rush name on post card today for FREE Sales Outfit.



NEW MAXILUME PIN-UP MIRROR LIGHT

MAXILUME COMPANY • 125 W. Hubbard • Dept. 95 • Chicago 10, Illinois



MAKE BIG MONEY THIS SUMMER BY ASSEMBLING THESE FANS NOW! RECORD FAN SEASON AHEAD!

The parts go together quickly and easily to make the quality fan as shown (left) that retails in stores everywhere for $7.95. We can make the parts but costly assembly is our bottleneck. Here's fun and profit for you or a member of your family assembling in spare time now and selling them in your own town like hot cakes this summer, for supplies and help shortages still hinder many manufacturers. Excellent way to help some young or worthy person you know to make money. Complete kit pictured includes powerful 110V–60 cycle electric motor (already assembled and made to meet U.L. requirements), all screws, nuts and easy instructions for assembly and testing fan. Youngster can do it in 30 minutes. Fan stands 11½" high, 8" blade. Order now. Supplies may be limited, as many are reordering after trial. Positive money back guarantee with every fan kit.

COMPLETE KIT

ONLY $3.95 In lots of 6

In lots of 3.....$4.29
In lots of 1.....$4.95
Regularly Retails $7.95

SENT POSTAGE PAID. SEND CHECK OR MONEY ORDER. NO C.O.D.'S. Ohio Orders Add 3% for Sales Tax.

R. DONALDSON CO.
369 South Maple St.
AKRON 3 OHIO

Copyrighted material

Which of these Amazing FLEXIBLE SHAFT TOOLS Do You Want?

Foredom PRESTO-FLEX with PENCIL-SIZE Handpiece $5.95

Grinds, Polishes, Sharpens, Cleans, Mills, Carves, Engraves, Etches on Metal, Wood, Glass and Plastic

Now you can turn your old motor, drill press, or electric drill into a Flexible Shaft Tool. Amazing new Presto-flex, latest addition to the Foredom flexible shaft family. Simply attach to your electric drill, drill press or motor. Presto—a flexible shaft machine! Off again in a jiffy! Pencil size handpiece gives you finger-tip control. Gets into tight places you can't reach with any other tool. Handy 35" overall length. And—only $5.95 complete! Order NOW. If you order Presto-flex for use on motor, specify motor shaft diameter and add 50c for motor coupling. (Available for 1/4", 5/16", 3/8", and 1/2" shafts.) No. 50 Accessory Set available $1.50 extra. Order TODAY.

Foredom FLEXIBLE SHAFT MACHINE with PENCIL SIZE Handpiece

Complete with MOTOR **$19.95**

5 REASONS WHY FOREDOMS ARE TOPS:

1. Extra power and longer motor life because motor not dwarfed to fit hand. 2. Correct handpiece size for deft, sensitive, finger-tip control. 3. No obstructed view of your work. 4. Freedom from gyroscopic action—hence better work. 5. Small handpiece size lets you get into hard-to-reach places.

Hundreds of Uses

Foredoms handle hundreds of tasks. Use them for pleasure or profit, for tinkering or expert craftsmanship. Their versatility is unlimited. Use them to grind, polish, mill, engrave, sharpen, slot, rout, saw, carve, clean, sand, etch, cut, etc. Ideal for internal carving of plastics, the astounding new craft. You can work on wood, glass, plastic and all metals with a Foredom. No. 25 Accessory Set (A truly versatile assortment) only $5.50 extra.

Over 60,000 Foredoms now in use

SEND NO MONEY

FOREDOM ELECTRIC CO., Dept. A-106
27 Park Place, New York 7, N. Y.

Mail Coupon Now:

Please send me FOREDOMS checked below on 10 day trial.

- ☐ Presto-Flex Tool ($5.95)
- ☐ Motor Coupling (50c)
- ☐ Flexible Shaft Machine ($19.95)
- ☐ No. 50 piece accessory ($1.50)
- ☐ No. 25 piece accessory ($5.50)
- Specify motor shaft diameter
- ☐ Catalog on request
- ☐ Send C.O.D. plus postage. I will pay postman.
- ☐ I enclose payment. Send postpaid.

(Money back either way if not delighted)

Name.....Age.....

Address.....

City.....Zone.....State.....

AIR RIFLES BENJAMIN AIR PISTOLS

PIONEERS - LEADERS

SEND FOR FREE FOLDER OF LATEST MODELS TODAY

If you want a REAL GUN for PRACTICAL USE inside or outdoors get a SAFE - CLEAN - ECONOMICAL - BENJAMIN with Adjustable Power and Amazing Accuracy. For BEST RESULTS use BENJAMIN H-C PELLETS. WRITE AT ONCE. BENJAMIN AIR RIFLE CO., 811 MARION ST., ST. LOUIS 4, MO.

STAR METAL BOATS

STAINLESS STEEL & GALVANIZED BOATS

FOR ROUGH USE

STAR METAL BOATS lead in comfort, convenience, durability, and lightness. Always dry and ready . . . no upkeep. Smoother riding for oars or outboard, spray rails stamped in hull. New lifetime Stainless Steel models, easily carried, nearly puncture-proof. Air chambers. Reasonable prices. Write for folder.

WRITE FOR *Folder*

STAR METAL BOAT CO. • GOSHEN, IND.

WOOD WORKERS

Lumber—Plywood Available

Harold Hunt wants to send you big new No. 15-A Catalog. Over 148 pages of woodworking ideas. 12 pages of rare woods in colors. UNEQUALED BARGAINS in imported and American woods, supplies, hard-to-find hardware. Send only 15c to cover postage and handling.

CRAFTSMAN WOOD SERVICE CO.
2728 S. Mary St. Dept. B-93 Chicago 8, Ill.

WOODWORKER'S TURNING AND JOINING MANUAL

The simplest, most practical ways to make end tables, chairs, benches, high-boys, book-racks, cabinets, all kinds of furniture in your spare time. A revelation of simplicity and helpfulness. Many illustrations. Full cloth DeLuxe edition, $1.49.

POPULAR SCIENCE Dept. 58
353 Fourth Ave. New York 10, N. Y.

Table Top MODEL RAILROAD!

LOCOMOTIVES
$12.50 to $27.00
FREIGHT & PASGR. CARS
$1.50 to $5.50

Imagine a roaring locomotive in the palm of your hand . . . cars not much bigger than this ad . . . all exact scale models that operate electrically on 15/32" track. You can have a whole layout on a card table or desk. Equipment easy to build from kits, or may be obtained ready-to-run, including freight and passenger cars, steam and diesel engines, track etc. See your Hobby Dealer or send dime for illustrated circular and price lists.

H. P. PRODUCTS CO., Hartford City, Indiana

THIS IS THE BUSINESS YOU DREAM ABOUT

QUICK STEADY PROFITS

CORADIO

The Coin Operated Radio

IT'S the new, fast-growing, depression-proof business. Coin operated radios are placed in hotels, tourist courts, clubs, hospitals, etc. on a commission basis—play 1 or 2 hours for 25c and produce immediate profits.

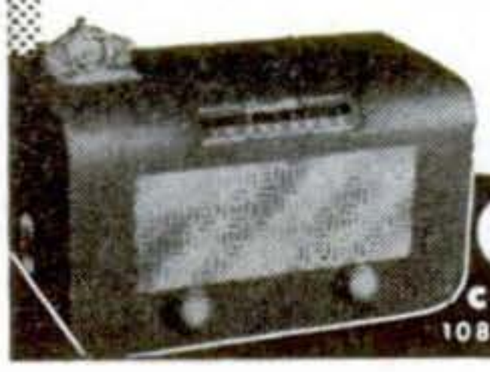
The best coin operated radio is CORADIO

ACT NOW

Start your own lifetime business, full or part time. Limited capital required.

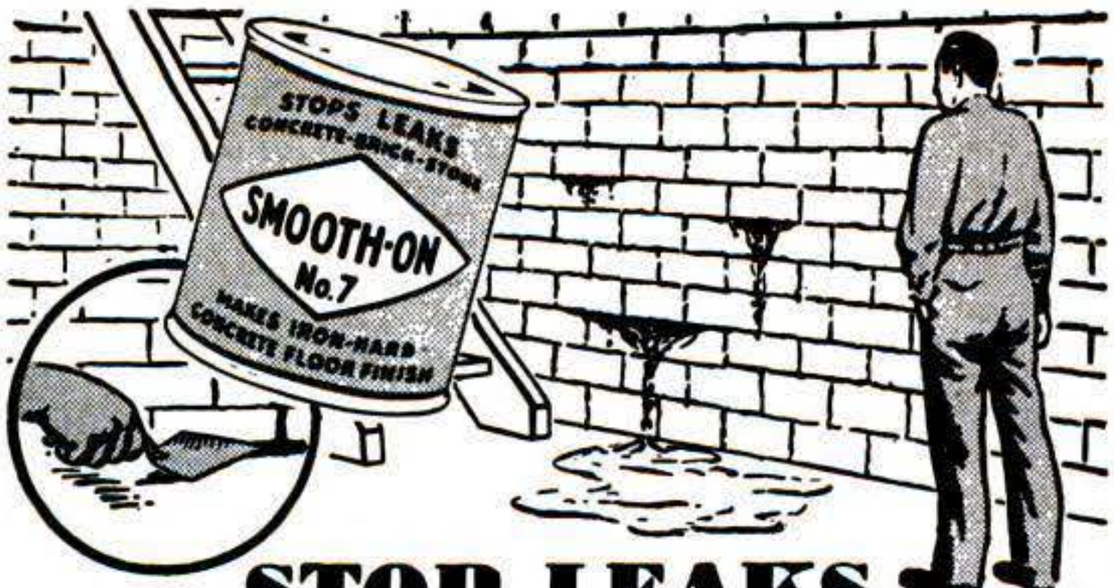
Send for further information.

***WRITE TODAY* Dept. P.S.**



CORADIO
COIN OPERATED RADIO
108 W. 31st ST. N. Y. 1, N. Y. WISCONSIN 7-5902

Copyrighted material



STOP LEAKS IN CELLAR WALLS

Do it with Smooth-On No. 7 Cement! Apply with trowel or stiff brush to leaky cracks, holes, porous spots, seams or other leaks in concrete, brick or stone walls and floors. The leaking will stop and Smooth-On will "stay put", for it expands slightly as it hardens. May be applied to wet or dry surfaces, indoors or outside. Use Smooth-On No. 7, too, to seal openings around pipes passing through walls. Buy Smooth-On No. 7 by name and number in 1-, 5-, 20- or 100-lb. size. If your hardware store hasn't it, write us.

FREE Leaflet and Handbook

We'll send you leaflet showing No. 7 uses, also the famous 40-page Smooth-On Repair Handbook describing other Smooth-On Cements and showing many helpful home repairs. 170 illustrations. Write today.

SMOOTH-ON MFG. CO., Dept. 58E
570 Communipaw Ave., Jersey City 4, N. J.

Do it with

SMOOTH-ON

NO. 7 CEMENT

Ottawa Self-Propelled Buzz Master

CLEARS LAND FAST! Powerful 7-HP motor with friction clutch for safe operation. Cuts down timber, brush and hedge; turn blade vertically and saw logs to length. Also furnished with post hole diggers. Has clutch pulley for belt work.

No Other Like It!

OTTAWA MFG. CO., 1-801 Brush Ave., Ottawa, Kansas

Do a Better Job
WITH ONE OF THESE
EMPIRE LEVELS

EMPIRE TORPEDO LEVEL

Smallest, most handy and accurate Level made. "Cigar-shaped"—no sharp corners to tear pocket. Aluminum stock. Only 3 oz. wgt. 9" long. Has Level, Plumb, 45° Vials.
No. 26 .....$2.00

ALUMINUM LEVEL — No. 151

Cast and Machined, a Beautiful Tool, with Patented, Removable Level and Vial.
With 2 Plumb, 2 Levels, 2 — 45° Vials. 18".....$6.00
24".....$6.50 28".....$7.00

Order EMPIRE LEVELS from your local dealer. Write direct for literature.

EMPIRE LEVEL MFG. CO.
707 S. 6th St. Milwaukee 4, Wis.

HERE'S ONE for your boat!

The right one! From the complete six-model Evinrude line, it's easy to choose the motor that gives you exactly what you'd like in power and performance. Three thrilling four-cylinder motors . . . smoothest on the water! A brilliant new "Sportwin" with dozens of exciting new features! Two models with the revolutionary FISHERMAN DRIVE — *weedless, shoal-riding, snag-proof* . . . a boon to fishermen! See your Evinrude dealer — look for his name under "Outboard Motors" in the yellow pages of your phone book. Catalog FREE — write EVINRUDE MOTORS, 5763 N. 27th St., Milwaukee 9, Wis.

SPORTWIN
28 thrilling new features — it's complete even to a fuel gauge!

SIX MODELS
the right motor for every boat — 1.5 to 33.4 certified horsepower.

WRITE FOR CATALOG!

EVINRUDE
FIRST IN OUTBOARDS • 39th YEAR

Copyrighted material

For BIGGER PROFITS

SELL THE FASTEST-MOVING AUTOMOTIVE NECESSITY

NU FORM

DEMOUNTABLE

BATTERIES

Exclusive territorial franchises are open to business men with the foresight to cash in on this opportunity. NU FORM Demountable BATTERIES are the fastest selling item in the automotive field today. Little wonder, too. Because it is the ONLY battery with separate changeable cells. This outstanding feature assures you of tremendous sales to fleet owners, taxi cab companies, and the millions of individual drivers who want better performance.

We train you in the specialized sales methods of selling NU FORM Demountable BATTERIES, show you how to make every dollar count. You learn the secrets of success thru intensive factory training.

Longer Life

Better Performance

Every Car Owner A Prospect

10-Year Guarantee On Every Battery

Write TODAY for complete FREE DETAILS about how you can get started in this profitable and interesting business. Don't wait. Write now. No obligation.

ASSOCIATED BATTERY ASSEMBLERS
7900-A South Vermont Ave., Los Angeles 44, California

Make $20 to $30 a Week EXTRA MONEY!

With the high prices of food, clothing and everything else, just think what you could do with extra money every week! Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to $2 or $3 an hour. Start in your basement or garage—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes C. E. P. No Canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. T. With a Foley you can file all hand saws, also band and cross-cut circular saws.

FREE PLAN

Shows How to Start

It explains how you can get business from home owners, farmers, carpenters, schools, factories, etc. "I get work from 20 and 30 miles away"—says C. H. S. Investigate—you can get IMMEDIATE DELIVERY on a Foley Saw Filer.

***Send Coupon For* FREE PLAN**

FOLEY MFG. CO.,
519-8 Foley Bldg., Minneapolis 18, Minn.
Send Free Plan on Saw Filing business, no obligation.

Name . . . . . .
Address . . . . . .

ASSEMBLE *King Midget*

45 MILES AN HOUR **90 MILES A GALLON**

New, low cost transportation. Practical. Safe. A pleasure to drive. Home assembly keeps cost low. Just bolt together our factory built units. Immediate delivery. Send 25c for detailed circular with 8x10 picture, 4-view drawings, price of all parts. Or send for actual Assembly Book with 42 photographs, blueprints, drawings, sketches AND above literature—all for $1 (refunded first order).

MIDGET MOTORS MFG. CO. *Athens, Ohio*

MILL IT ON YOUR LATHE

PALMGREN MILLING ATTACHMENT

Mill, slot, grind, groove, square shafts, recess-on lathe. Shops, schools, homes need this fixture. Fits Craftsman, Atlas, So. Bend, Logan, Sheldon, Perkins and others. Accurately graduated for rotary and vertical feed. No. 150, 1½" Jaw $18.75. No. 250, 2½" Jaw, $24.75. No. 400, 4" Jaw, $39.75.

ORDER TODAY! Write for Circular No. 10

CHICAGO TOOL and ENGINEERING CO.
8396 South Chicago Avenue Chicago 17, Illinois

Save Money-Make Money with **LARSON Leathercraft**

For gifts or for sale—make easy-to-assemble leather items. Complete stock leathers, tools, accessories.
Send ten cents for new catalog of 101 money-making ideas.

J. C. LARSON CO. 826 S. Tripp Ave. Chicago 24, Illinois

TRAILER BUILDERS!

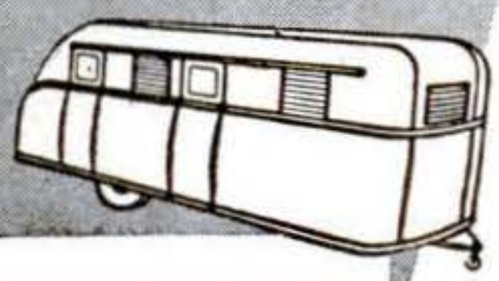
BUILD or BUY . . . SPECIFY

• **Torq-Less Axles** • **Bull Dog Hitches and Parking Jacks,** ***Safety-Engineered by***

HAMMER BLOW TOOL COMPANY
D-24 Wausau, Wisconsin

Send for FREE Catalog

It's EASY! ECONOMICAL!



Build Your Own Trailer with NATIONAL'S Simplified Plans

Beat the housing shortage with a full-size house on wheels or add new pleasure to your vacations and week-ends with a sleek sport trailer. Step-by-step instructions and complete bill of materials with every plan. *Three different models.*

NATIONAL MODEL 27: A 27-ft. luxury liner with 3 rooms, lavatory, sleeping space for six. Plans **$1.00**

NATIONAL MODEL 20: A 20-ft. cabin trailer that's good-looking and sturdy, with beds for four. Plans **$1.00**

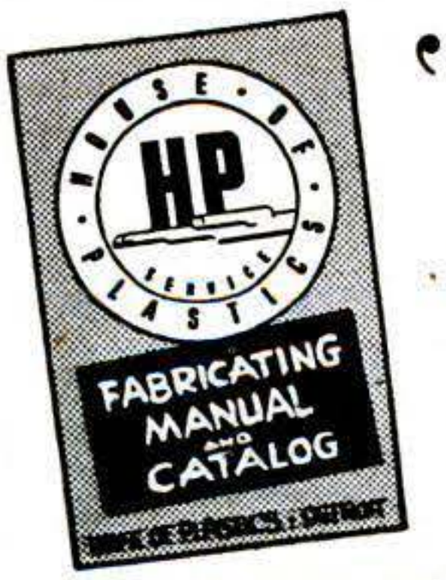
NATIONAL CAMPER: The sport trailer you've wanted for hunting, fishing, vacations. Sleeps two. Plans . . . . . **.50**

ORDER ALL THREE—AND GET ONE FREE
Complete set $2.00

Big parts catalog FREE with any order! **FREE!**

NATIONAL TRAILER STORES
Dept. 53 • Box 2353 Terminal Annex • Los Angeles 54, Calif.

Copyrighted material



"PLASTICS"

Work in a fascinating and profitable hobby. Just out—our latest fabricating manual. Tells you how to work with Plastics. Our new Catalog provides all needed materials: Plexiglas — Lucite — Tenite—Catalin—Acetate—all in sheets, rods, and tubes. Complete line of cements, dyes, accessories and supplies. Send 20c today for Fabricating Manual & Catalog. We apply this amount on initial order.

HOUSE OF PLASTICS

8648 Linwood Avenue, C.M.O. Dept., Detroit 6, Michigan

NEW B-M POWER MOWERS

AT LOW FACTORY COST

For Modern Lawn Care. Newest model self-drive, three-wheel, rotary blade mower. Equipped with quick-starting, dependable, trouble-free 1½-2 h.p. Clinton engine. Light. Sturdy. Choose from three models of assembled mowers or Build-it-yourself kit of parts. **Guaranteed.** FREE literature.

B-M MOWER COMPANY

Box 66-S Blue Mound, Kansas

ADJUSTABLE BICYCLE SADDLE BRACKET

New, adjustable Saddle Bracket lowers saddle for use by younger children. Brings saddle down and forward so younger feet can reach and operate pedals safely. Simple, safe, sturdy steel bar. Easy to install and attach saddle. Adjusts 26" bicycle to 24" size. For boys or girls models. Made in ⅝ inch and ¾ inch diameters. Specify diameter desired. Postpaid anywhere in U. S. *Money back guarantee!*

Attractive Dealer Proposition. Write for Details.

CONNIE BERT CO.

8115 Clinton Ave., Cleveland 9, Ohio

INBOARD MARINE ENGINE $159.95

● **Famous Clinton Angler air cooled boat engine—with forward, neutral and reverse. Includes 34" shaft, shaft log, stern bearing, propeller and 6 ft throttle control. No extras to buy. Quickly installed. For boats up to 16 ft. Imd't delivery. Penny post card brings FREE LITERATURE.**

CLINTON ENGINE CO.

16353 E. Jefferson, Detroit 30, Mich.

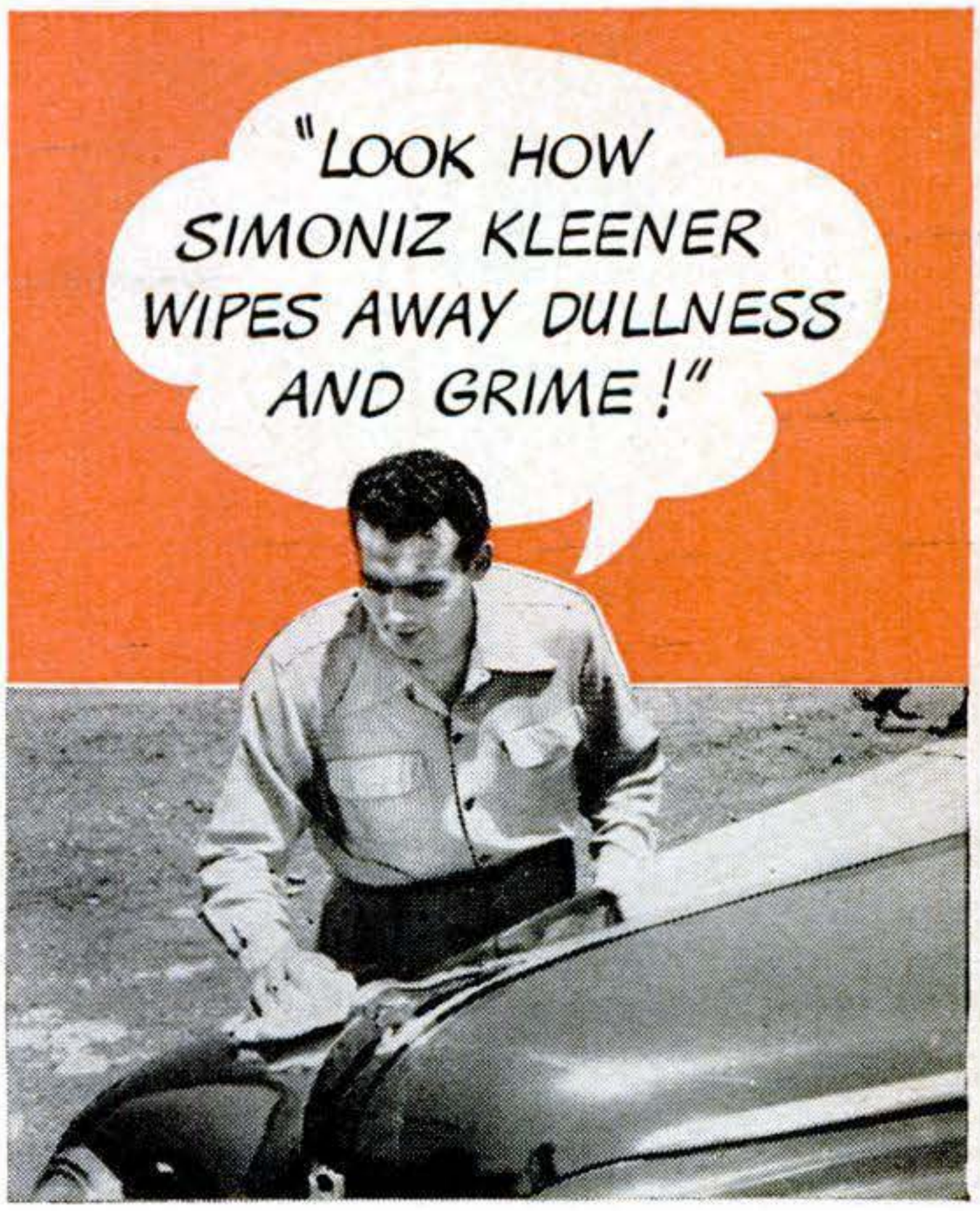
The finest that can be offered at the price!

PRECISION MICROSCOPE

We've searched, we've tested, we've queried! In short we've done everything possible to make certain that this is the best microscope value we can offer at the price. Four magnifications 65x, 100x, 130x, 200x. Two objectives. Adjustable eye piece, fine focusing motion. Concave two motion mirror, draw tube, acid proof stage. Rugged tilting stand. Precision made of quality materials with finest tested Optics. Complete with educational instruction manual. Your money back if not satisfied. Only $29.50 plus postage C.O.D. or send $29.50 and save postage.

THRIFT MERCHANDISE CO., Dept. A

307 Fifth Ave. New York 4, N. Y.



You can now Simoniz your car in ½ the time!

It's true—in less time than ever your car can have that lasting, "brighter-than-new" look! The first quick step is Simoniz Kleener (liquid if slightly dull—paste if unusually drab). This brings out all the brilliance and luxurious color you've dreamed of. Then, to protect the glamorous new finish and keep colors from fading—apply famous Simoniz. After that only a dry cloth is needed to preserve this wondrous new beauty for months.

CERTIFIED SIMONIZ STATION

If you want your car Simonized for you, go to a Certified Simoniz Service Station. You are then assured of genuine Simoniz Products and factory approved methods.

THE SIMONIZ COMPANY, CHICAGO 16, ILL.

Motorists Wise

SIMONIZ

TRADE MARK REG.

GIVES CARS LASTING BEAUTY

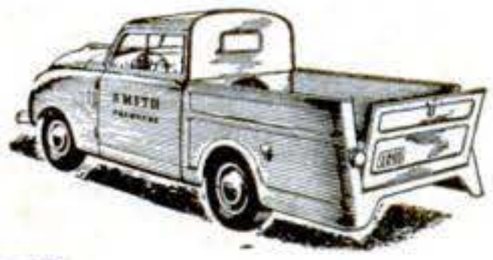
Copyrighted material

It's sensational! Smart Crosley station wagon seats 4 or carries ¼ ton load; yet costs $600 to $700 less than any other station wagon and operates for about half as much. For instance:

James Corum, 313½ Hiawatha Ave., Louisville, Ky., reports he drove his Crosley Car 256 miles; averaged 40½ miles per gallon of gasoline. Total cost, $1.83.

SEDAN: Seats 4 in comfort, with ample luggage space.

PICKUP: Cuts service, delivery costs.



PANEL DELIVERY: Full ¼-ton capacity.

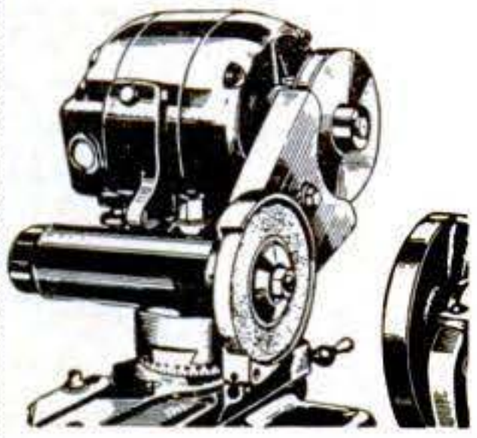
Revolutionary 4-cylinder engine

CROSLEY

a FINE car

For beautiful full color catalog, write: Crosley Motors, Inc., 2532-JM Spring Grove Ave., Cincinnati 14, Ohio

GRIND IT on Your Lathe



A powerful *External Grinding Attachment* for sharpening reamers and cutters, grinding hardened bushings, etc. Has precision ball bearing spindle with 4" x 1/2" grinding wheel. 5 sizes for South Bend Lathes —adaptable to others. Write for dimension sheet. Price with 1/4 h.p., 1 ph. motor, f.o.b. factory **$49**

SOUTH BEND LATHE WORKS 456A E. Madison St. South Bend 22, Ind.

PACKAGED BOATS • BOAT PATTERNS

Boat Pattern Catalog — 55 Famous Plywood Designs with full size cut to shape patterns, — blue prints — Kayacks to Cruisers — by the outstanding specialists MacGregor & Deed — plus Wm. Deed's booklet "Plywood Boats." Send $1.00.

Also Available . . . **PACKAGED BOATS**

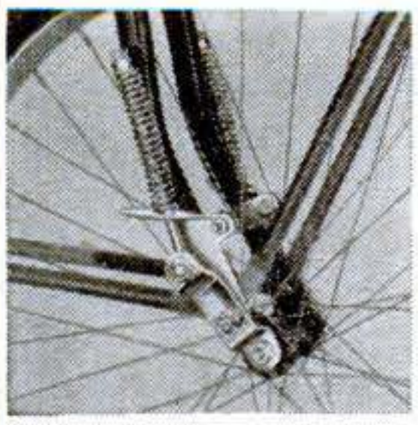
Save 50% — Build from our precision cut moulded and sheet plywood Kits — Finest design — Full hardware — Nothing else to buy — Illustrated instructions — $34.50 up — Send 25c (coin) for photos and literature.

MARINE MART — BUFFALO 7A, N. Y.

Do You Ride a Bike? Here's the Real

SHOCKMASTER

for all Bicycles



- LEVELS ROUGH ROADS
- PREVENTS BROKEN SPOKES, WHEELS, FORKS
- MAKES RIDING SMOOTHER, SAFER
- EASY TO INSTALL

A Shockmaster and front wheel shock absorber ruggedly constructed of nickel plated steel and engineered for years of real service. It'll pay for itself in added pleasure, saves tires and eliminates many costly repair bills. 20,000 satisfied users. Order yours today. Only $3.69 postpaid. No C.O.D.'s. Complete satisfaction or money back. Dealers Wanted.

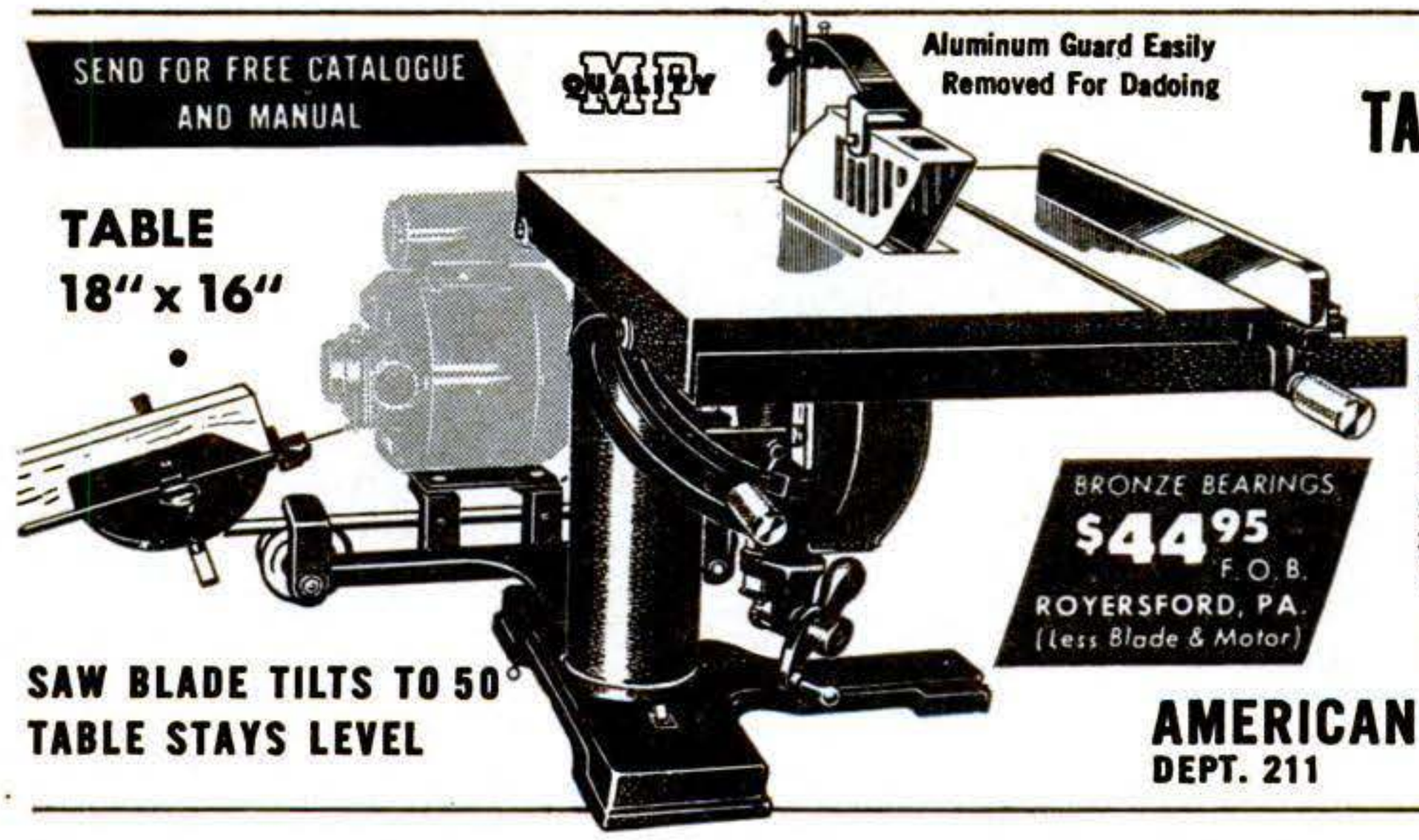
H. M. GIBB and COMPANY
1304 PENOBSCOT BLDG. DEPT. B DETROIT 26, MICH.

LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c, Other patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 10c each. 25 Novelty Patterns, 30c. **All 62 Full Size Patterns, $1.00 Postpaid.** Strother Pattern Service, Dept.7-AE, Box 383, Belington, W. Va.

SEND FOR FREE CATALOGUE AND MANUAL

MP QUALITY



NEW IMPROVED $8.

TABLE MODEL TILT-ARBOR SAW

OIL IMPREGNATED BRONZE BEARINGS OR DOUBLE SHIELDED BALL BEARINGS, BOTH WITH THE PATENTED BALL BEARING TRANS-AXIAL MOTOR DRIVE

MODEL #2021X AS SHOWN WITH COMPLETE MITRE GAUGE. Precision etched scales show angles on mitre gauge and saw cradle. STEEL BAR RIP FENCE. ALUMINUM SAW INSERT AND GUARD. STEEL SPLITTER. BALL BEARING TRANS-AXIAL DRIVE 5/8" GROUND ARBOR. "COMPO" OIL IMPREGNATED BRONZE BEARINGS WITH OIL CHAMBER AND CUP, (OR, DOUBLE SHIELDED BALL BEARINGS, $5 EXTRA). TABLE 18" x 16". BUILT IN SWITCH. Depth of Cut 2 5/16". Shipping Wt. 110 lbs. Requires 1/3 or 1/2 H.P. Motor.

(BALL BEARING FLOOR MODEL WITH 18" x 32" TABLE INCLUDING EXTENSION . . . . . $79.50)

AMERICAN MACHINE & TOOL CO., Inc.
DEPT. 211 ROYERSFORD, PA.

Copyrighted material

NOW you can PREVENT RUST and SCALE from forming in your AUTO RADIATOR

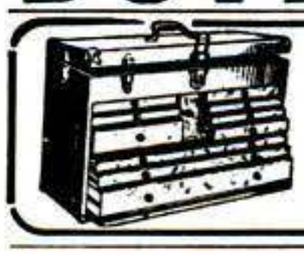
KEEP WATER CRYSTAL CLEAR. Installed in radiator hose, Butler De-Scaler's Galvanic Cell Action prevents RUST and SCALE throughout the entire cooling system. Causes the removal of OLD RUST AND SCALE.

PROTECT your new car's cooling system from the start . . . end radiator rust-ups in your old car. Butler De-Scaler has been used with great success industrially for over ten years . . . proven in thousands of truck and bus fleets. Now available for car owners. Unconditionally guaranteed . . . for one year . . . will not interfere with Anti-freeze or stop leak. Easily installed . . . available at service stations, garages, and car dealers everywhere. If no dealer near you, write BUTLER ENGINEERING CO., 2624 Rousseau St., New Orleans 11, Louisiana.

New Fair Trade List Price $2.95

Butler De-Scalers are also available for use in boilers, home hot water systems, Diesels, etc.

BUTLER De-scaler



GERSTNER Tool Chests

Extra values and longer life built into genuine *Gerstner* Chests for machinists and toolmakers. Free catalog.

GERSTNER TOOL CHESTS
548 Columbia St. Dayton 7, Ohio

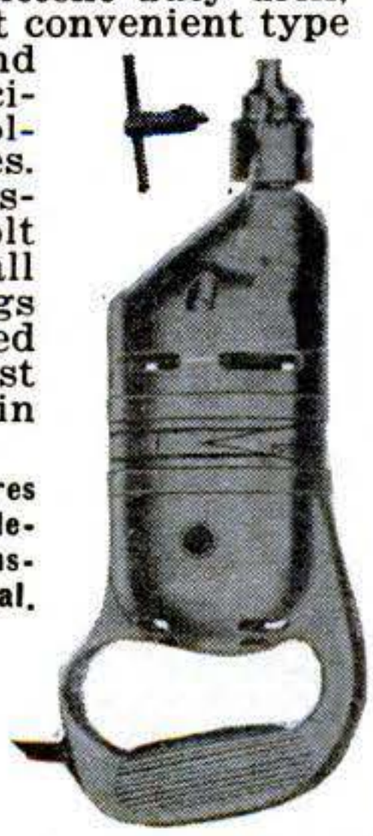
Say You Saw It In Popular Science

TERRIFIC VALUE—
PORTABLE ELECTRIC DRILL

(Sold at less than established factory price so we cannot mention brand name)

Only **$19.95** equipped with ¼" Jacobs Geared Chuck and Key. Not an intermittent duty drill, but a full size rugged tool. Most convenient type switch, natural grip handle, and balance like a six shooter. Precision cut gears—turbine type cooling blower—extra long brushes. No stalling under heaviest pressure because of powerful 110 Volt AC-DC motor and multiple ball bearing thrust. Other bearings self-aligning lifetime-lubricated Oilite type. Made for toughest year-in and year-out service in plant or on construction jobs.

Amazing perpetual factory guarantee assures you of a lifetime of trouble-free use. 25% deposit on C.O.D.'s. Full refund (you pay transportation) if not pleased with drill after trial.



BUFFALO RADIO SUPPLY
219 Genesee St.
Buffalo 3, N. Y.

NEW INDUSTRIAL QUALITY *Atlas* TOOLS FOR YOUR *HOME SHOP*

Now you can go ahead with your plans to equip your shop for real "professional" workmanship. These are the industrial quality tools every true craftsman has long been waiting for.

NEW 24" JIG SAW

A massive tool for the smoothest work on every jig saw operation in woods, plastics, light metals, composition materials. SKF ball bearings. 4 speeds. 14" x 14" table tilts right or left, swivels 90° for cutting long stock from side of saw. Overarm easily removed for cutting panels.

NEW WOOD SHAPER

A most valuable tool for cabinet making, custom furniture, storm sash, screens, etc. Has stationary spindle with 21" x 15" elevating table. Large cutter capacity. SKF ball bearings.

Ask your Atlas distributor or send for illustrated literature about these unusual new tools for fine quality workmanship.

ATLAS PRESS COMPANY
555 N. Pitcher St., Kalamazoo 13D, Mich.

Copyrighted material

WARNS YOU WHEN HAND BRAKE IS ON!

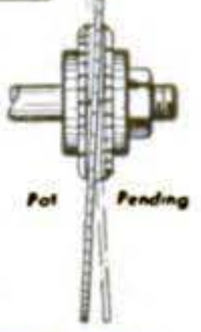
- Reduces Wear On Brake Lining
- Cuts Repair Bills Makes Driving Safer
- By Removing Cap, Serves as Handy Light for Reading Maps, Notes

Emergency Brake Signal Lite flashes brilliant red—warns you emergency brake is engaged the minute you turn on ignition. No more forgetting—no more driving with dragging brakes—no more scored brake drums—or expensive brake re-lining! **Brake Signal Lite** flashes only when ignition is on—can't drain battery. Assures you of good brakes **when you need them!** Fits instrument panel of any car or truck. Easy to install—you can do it yourself. Complete instructions with each **Lite.** Order one from your dealer now. If he cannot supply you, send $2.00 (M.O. pref.) and we will ship promptly postpaid.

JOBBERS' TERRITORIES AVAILABLE!

EKLIND TOOL & MFG. CO.
2627 N. WESTERN AVENUE • CHICAGO 47, ILL.

YOUR CIRCLE SAW BLADE CAN CUT GROOVES LIKE THIS
Easily — Quickly — Accurately



YES—THIS NEW INVENTION WILL FIT THE ARBOR OF ANY WOOD POWER CIRCLE SAW—AND WILL SAW ANY DESIRED GROOVE CLEANER, EASIER AND FASTER THAN ANY DADO HEAD ON THE MARKET TODAY . . . . GRADUATED IN 32nds AND NUMBERED TO CUT ANY WIDTH GROOVE WITH YOUR SAW BLADE . MICROMATIC ADJUSTMENT MAKES POSSIBLE A CHANGE IN CUTTING ANGLE IN 15 SECONDS . . . . **WARREN DADO SAWING WASHERS** CAN BE LEFT ON THE ARBOR OR QUICKLY REMOVED FOR CUT OFF SAWING.

. . . ORDER YOUR SET OF FOUR WASHERS TODAY, TRY THEM FOR TEN DAYS. IF NOT SATISFIED, YOUR MONEY WILL BE REFUNDED.

Arbor ☐ ½ ☐ ¾
Sizes ☐ ⅝
☐ Check
☐ Money Order
☐ Free Booklet

Gentlemen:- Please send _____ sets of sawing washers:
Name _____ PLEASE PRINT
Address _____
City _____ State _____
ALL SETS SHIPPED POSTPAID

WARREN DADO SAWING WASHERS CO.
P. O. BOX 98 NORTH END STATION
DETROIT, MICHIGAN

SAFE AS A HAND SAW
JUST GUIDE IT!

More like magic than any tool you ever saw. Imagine an electric scroll saw only slightly heavier than a hand coping saw . . . a tool that takes no effort to run, no pressure to feed. Works at any angle—on big assembly jobs or on the tiniest piece you can hold in your fingers. Runs 7200 **strokes a minute . . . so fast the blade seems to stand still.** Sturdily built . . . only two moving parts . . . never needs oiling. Easily cuts intricate designs—so smooth it eliminates sanding. Novice or craftsman, a thrill awaits you when you get a Moto-Saw in your hand.

THOUSANDS OF SATISFIED USERS

U.S.Patent2233862
Other Patents Pend.

DREMEL MFG. CO.
Dept. S-128-E
Racine, Wisconsin

No Limit to Length of Stock it Will Cut. Saws to Center of 19" Widths.

It's fast . . . cuts on an average of 1 ft. per minute up to ¾" medium hard wood. Operates on 110-120 V. 50 or 60 cycle alternating current. If your dealer does not yet have Moto-Saw, send **$5.85** . . . we'll pay postage. Or send **$1,** pay postman balance plus postage. MONEY BACK if not delighted after 5 days' trial.

"YOU ARE UNDER ARREST!"

Help Bring Crooks to Justice Through Scientific
CRIME DETECTION!

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you **in your own home.** Learn Finger Printing, Firearms Indentification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I. A. S. students or graduates. We can prepare you for this fascinating work, during spare time. Write today, **stating age,** for "Blue Book of Crime."

INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 9365, Chicago 40, Ill.

REYNOLDS CIRCULAR SAW GRINDER

SAWS 5"-30"

FOR JOINTING GUMMING • SHARPENING
ALL TYPES OF CIRCULAR SAWS
WRITE FOR CIRCULAR
REYNOLDS MACHINERY CO.
303 EDDY ST., PROVIDENCE 3, R. I.

Say You Saw It In Popular Science

STOP CHANGING MOTOR OIL!

End this needless waste and expense forever with
RECLAIMO Today's Most Advanced Oil RE-REFINING Filter

Continuously cleans and **RE-REFINES** motor oil as you drive (by utilizing motor heat)—keeps oil in high grade lubricating quality at all times—reduces motor wear to a minimum! Proves conclusively that **"Oil Does Not Wear Out Mechanically"** as stated by **U. S. Bureau of Standards, (Bulletin 86).**

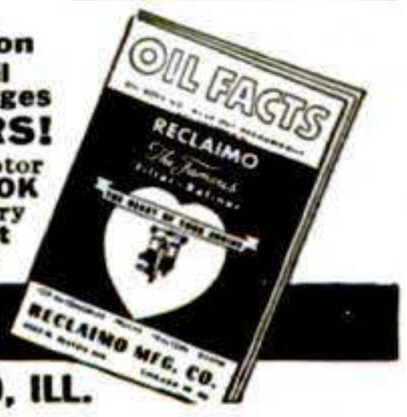
NEW ADDED FEATURE!
Gas - Moisture Vapor Injector
Increases Mileage with Smoother Performance

"RECLAIMO"
- **REMOVES SOLIDS (by filtration)**
- **REMOVES WATER (by distillation)**
- **PREVENTS Excess Fuel Dilution**
- **PREVENTS Acid and Sludge Formation**

MAINTAINS Stable Viscosity **ELIMINATES** All Oil Changes

CAR • TRUCK • TRACTOR OWNERS!

You'll want to know more about Reclaimo's Oil, Motor and Money-Saving Features. **FREE 40-PAGE BOOK "OIL FACTS"** gives you the complete "Reclaimo" story plus details about our **New 90-Day No Risk-No Cost TRIAL OFFER!** WRITE for YOUR COPY TODAY!

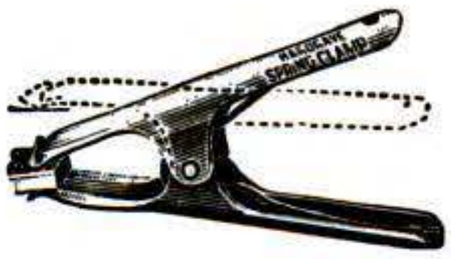


RECLAIMO MFG. CO.
5083 ELSTON AVE., Dept. 77, CHICAGO 30, ILL.

Copyrighted material

HARGRAVE

IMPROVED SPRING CLAMP



Has dozens of uses in every workshop. Can be applied or removed instantly. Surface of work is tangent to curve of jaw at any opening. Ideal for welding, light gluing, etc. Holds firmly without marring the work. Openings 1, 2 and 3 in.

At Hardware and Mill Supply Dealers Everywhere.

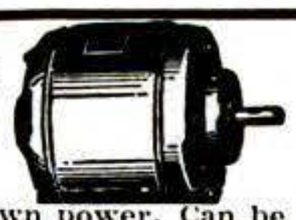
Write for Catalog of Complete Line

1955 Waverly Ave.
Cincinnati 12, Ohio

The CINCINNATI TOOL Co.

MOTOR BARGAIN

1/30 HP 24 volt DC motor 2450 R.P.M. .95 amps ¼" shaft size overall 3" x 4". Weight 3 lbs. Also operates on 32 volts.....only **$2.45**



USE AS 6 VOLT GENERATOR—Generate your own power. Can be operated on your bicycle wheel. Furnishes sufficient power for two 6 volt bulbs. Resistor furnished free with each motor enables you to maintain constant voltage. Special Price **$2.45**, or **4** for **$7.50.** Lots of **24** for **$36.00.**
Prices are F.O.B. Chicago. Immediate delivery. Send check or money order today. Sold on money back guarantee.

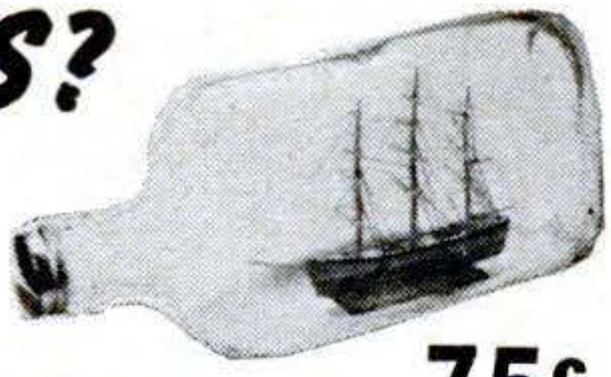
C & M EQUIPMENT CO. 1831 S. State St., Dept. B-5 Chicago 16, Ill.

CURIOUS?

ABOUT A

SHIP-IN-A-BOTTLE

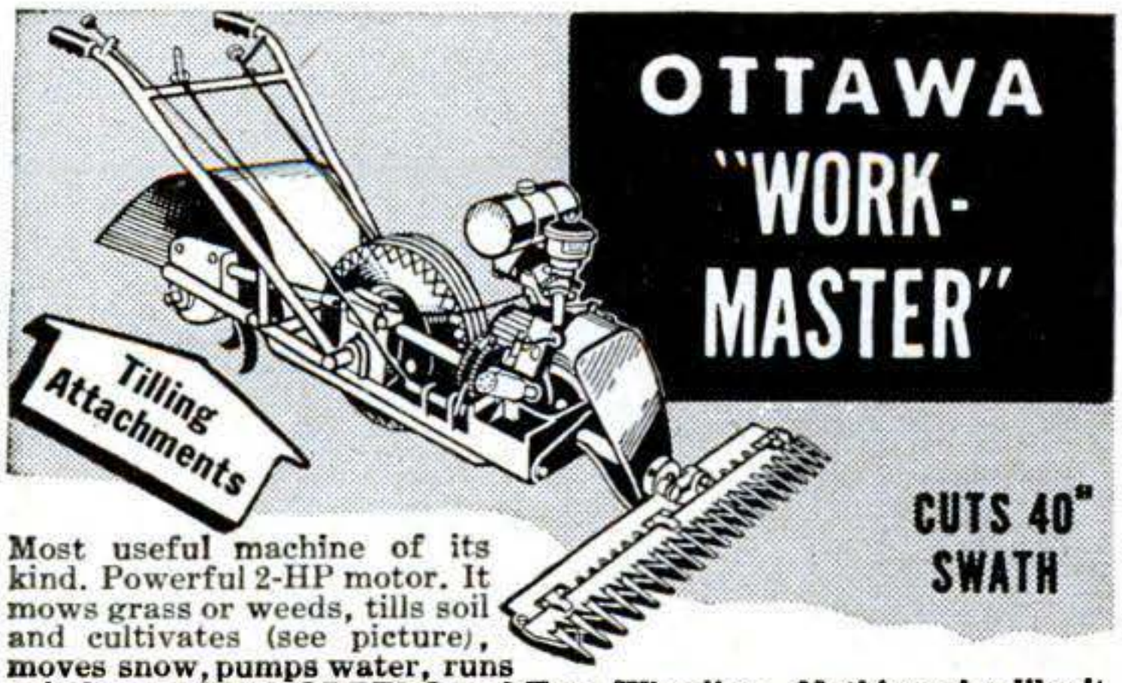
HERE IS THE SECRET



PLUS all of the material for only 75c postpaid, less bottle.—For other unusual and beautiful projects send 10c for the new, fully illustrated catalog.

75c Postpaid in U.S.A.

Braun-Craft 1232 ETOWAH, DEPT. PS4 ROYAL OAK, MICHIGAN

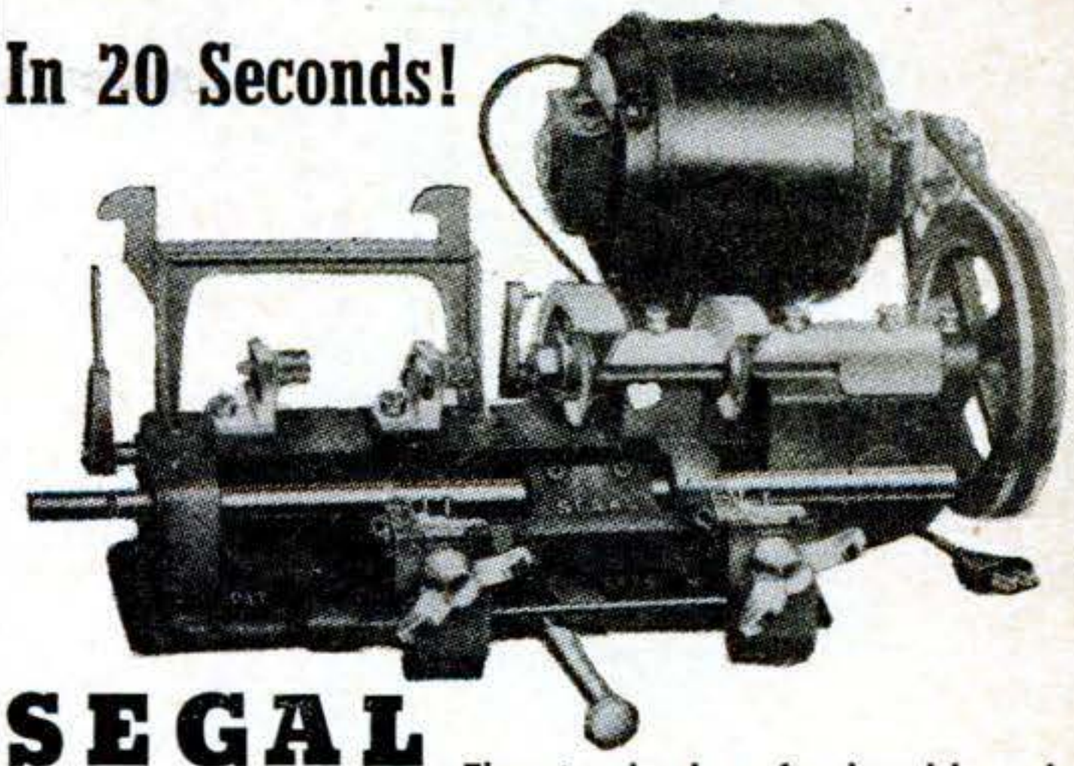


Most useful machine of its kind. Powerful 2-HP motor. It mows grass or weeds, tills soil and cultivates (see picture), moves snow, pumps water, runs grinder, etc. **TWO SPEEDS** and Free Wheeling. Nothing else like it. "WORK-MASTER" is much needed year 'round machine. Mows close to trees and under fences. Follows ground contour. One man mows 3 to 6 acres a day. Boy or woman operates easily. Designed for private homes, estate, etc. Sold direct to user. Free details with low prices.

OTTAWA MFG. CO., 3-801 Lawn Ave., Ottawa, Kansas

MAKE YOUR OWN KEYS

In 20 Seconds!



SEGAL KEY MACHINE

The standard professional key duplicator used by locksmiths for over a quarter of a century.

- ***Duplicate All Types of Keys.***
- ***Replace Lost Keys Quickly.***
- ***Keep Closer Control Over Keys.***

START A PROFITABLE BUSINESS!

Make keys for others! Small investment—big profits!

Write for Descriptive Folder and Price List

NORWALK LOCK CO.

Division of Segal Lock & Hardware Co., Inc.

395 Broadway, Dept. PS **New York 13, N. Y.**

NEW! Nothing else like it!
Thrilling, live 5-ft. action—
Yet only 21 in. long!

Trade Mark

Stubcaster

CASTING AND TROLLING ROD

Sensational coil spring gives *full length rod action!* • Shortened arc gives greater accuracy —*maximum distance* • *Fits your tackle box*— 21" overall breaks to 14" • Reduces backlash! • Cast "close in" streams, overhand or underhand—no foliage interference • Cast 3 or 4 in a boat without tangling lines! • Brings fish right to net; fewer losses • *U. S. Patents Pending!*

$5.95 without reel

Money back guarantee! If dealer can't supply, send check or money order to

WALTCO PRODUCTS, Dept. 76-E

2300 W. 49th Street • Chicago 9, Ill.

Copyrighted material

World's Most Complete Hand Tool

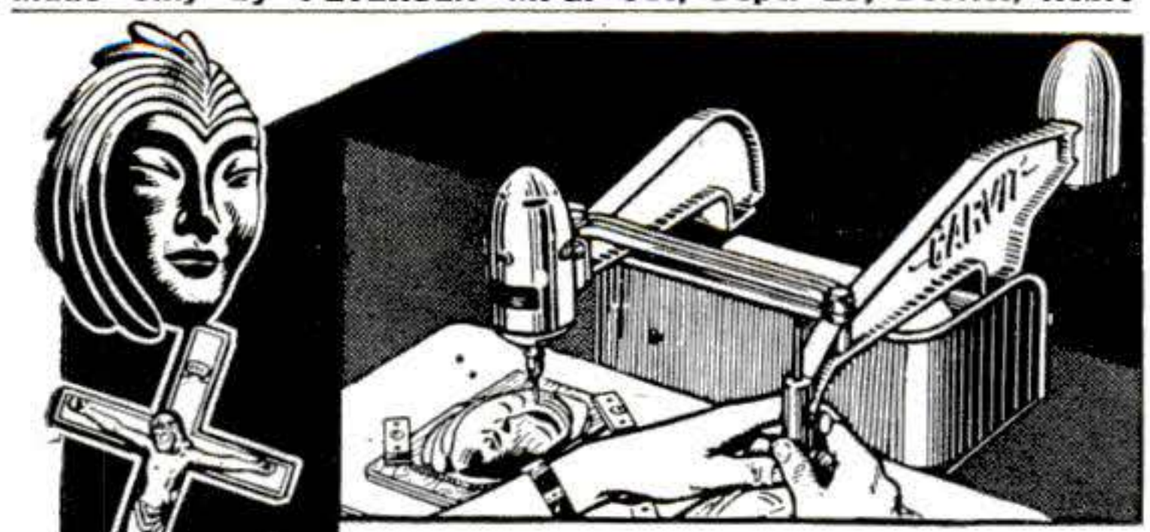
Gives One Hand a TON GRIP

New

VISE-GRIP WRENCH

This *new* super-powered tool adjusts to ratchet action or LOCKS to the work—both hands free! Important new features: 1—Involute Jaw Curve gives tremendous holding power, all shapes. 2—Thin Nose, stronger than ever, gets into close quarters. 3—Super Wire Cutter cuts wire, small bolts. 4—Knurled Jaw Tips hold to the very tip. 5—Easier to open from locked position. Positively—the world's most Complete, most Powerful, most Useful hand tool! Fine alloy steel. Nickel plated. WITH cutter—7", $2.25; 10", $2.50. WITHOUT cutter—7", $1.85; 10", $2.25. If not at your dealers, order direct. Postage paid if price accompanies order.

Made only by PETERSEN MFG. CO., Dept. E5, DeWitt, Nebr.



Become a skilled woodcarver in 20 minutes!

— with the amazing Dumore Carvit: a delightful hobby, complete in one tool!

Carve useful ornaments for the home — distinctive gifts — fine carvings that *sell!* The Carvit reproduces models (from dime store or gift shop) in beautiful mahogany and other fine woods. Just trace the model. The Carvit does the rest. With an index attachment, you can carve objects like busts and statuettes. It's great fun! See it at your hardware or department store today, or write for full details.

Tear Out This Coupon and Mail Today!

THE DUMORE CO., Dept. E-59, Racine, Wis.

Check
- ☐ Please send me complete information on the Carvit.
- ☐ Please send me one Carvit, $48.50 enclosed.
- ☐ Please send one Carvit with index attachment, $58.25 enclosed. Shipping charges C.O.D.

Name_____

Address_____

City_____ (____) State_____

H-15

Famous BANNER FIREWORKS

OH-BOY! Don't be disappointed. Get the best for your money. Famous Banner Fireworks have all the ZIP, BOOM, BANG you expect of fireworks. This year several new creations have been added. You'll thrill to every last piece in this **Big Bargain Assortment.**

BIG SPECIAL DEAL—ONLY $4.95

Retail value $11.25. Buzz Bombs—Star shells Block Busters—Zig-Zag Whistles—Flashlight Crackers—Sky Rockets—Roman Candles—Repeating Aerial Bombs, Sparklers and many others. Over 500 pieces in all. Rush order today. Supply limited. Send money order, bank draft or currency. No C. O. D's. Catalog FREE.

BANNER FIREWORKS MFG. CO., INC., DEPT. 146
446 Capistrano Toledo 12, Ohio

Bar Bells

Buy Direct From Factory

Write for free booklet and price list

$8.95 up

INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. C
Los Angeles 11, Calif.

Make your own power tools!

MILLS - SHAPERS
DRILL PRESSES
CIRCULAR SAWS
BAND SAWS
WOOD LATHES
JOINTERS - VISES, ETC.

"How to build a LEWIS MILL": See Apr. '48 Pop. Sc.

Save up to 80% of new tool cost!

Rough or semi-finished castings for 23 wood and metal working tools and equipment. Semi-finished castings easily completed with lathe and drill press. High precision. Profitable entertainment! FREE Illustrated 32 page catalog!

LEWIS MACHINE TOOL COMPANY
P. O. Box 7446 Sta. L, Dept. S, Los Angeles 23, Calif.

Say You Saw It In Popular Science

TIME & DATE *at a Glance*

GUARANTEED

BELL CALENDAR WATCH

Tells time, name of day and date. Day name changes automatically.

No. BR 383 — 17 jewels, water-shock resistant, anti-magnetic, radium dial and hands, unbreakable crystal.
ALL STAINLESS STEEL CASE **$55.00**

Illus. one-half actual size

Other fine watches from **$12.65**

ORDER BY MAIL: Send check, money order or pay C.O.D.
THESE LOW PRICES INCLUDE FED. TAX & POSTAGE.
Write for FREE Booklet "BR".

BELL WATCH COMPANY, INC.
Time and Life Bldg., Rockefeller Center, New York 20, N. Y.

Copyrighted material

War Surplus Bargain!

BRAND NEW

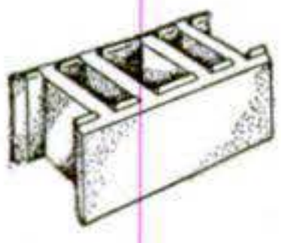
ALL STEEL CABINETS

Here's the home work-shop tool and storage cabinet you've been waiting for! Keep your tools, parts, equipment, safe and in one place. All-steel construction, with 11 large and 3 small drawers. Hinged top opens to roomy storage space for large tools, parts, etc. Large drawers have 32 removable metal dividers to make 60 bins of any size desired. 3 small drawers have 30 metal dividers to make ideal nut, bolt, screw and small parts storage compartments. Each drawer has drop handles and index card holder. Rust-resistant baked-on enamel finish is an attractive green. Composition top makes handy desk or non-slip work table. 2 locking bars keep contents safe—need only 1 padlock. Sturdily constructed to last a lifetime. 39" high; 47" long; 24" deep.

Worth at least $100.00
Our price to you **$54.75** F.O.B. Illinois Ordnance Depot Marion, Illinois

ACME EQUIPMENT CO., INC.
128 South Clinton St. Chicago 6, Illinois

Make BIG PROFITS



OPERATING YOUR OWN

CEMENT BLOCK MANUFACTURING PLANT

Easy to Get Started

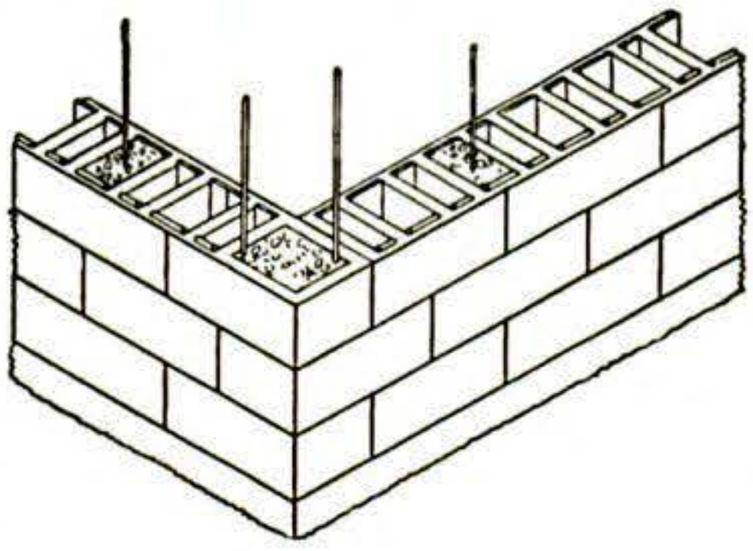
BIG EARNINGS await those aggressive enough to take advantage of today's building boom and get into business for themselves operating a modern efficient cement block making plant. Our patented Interlocking Mortarless block is the answer to the high cost of building. These blocks are easy to lay being self-aligning -no mortar used.

Meets Standard Building Requirements

Building experts have predicted at least a 10-year building boom to provide housing and needed commercial buildings. Large market in garden walls, patios, barbecues, extra rooms, etc. Our machines unexcelled for speed and economy in making blocks. Profits in this market are limited only by your efforts.

Exclusive Territories Open

Exclusive territorial franchise is granted to each Mortarless Concrete Block plant insuring big earnings and protecting your investment. Complete information supplied for plant operation. Get in on the big Spring and Summer building activity just ahead. Complete details supplied on what it will cost you to get started as OWNER and OPERATOR of a MORTARLESS CEMENT BLOCK PLANT. Act NOW! No obligation.



GET THE FACTS TODAY

Write to

MORTARLESS TILE MACHINE CO., INC.
Dept. PS-5
2623 Riverside Drive
Los Angeles 26, Calif.

DRUM SANDING of scroll work and many other curved surfaces is easier when you equip a flexible shaft with a tight-gripping JACOBS HAND-TITE CHUCK.

When you add a flexible shaft equipped with a JACOBS CHUCK to your power tool set-up, your workshop takes a big jump in versatility. Sanding, buffing, drilling, sawing and many other hand-held operations are possible when the tools are held tight and true in a JACOBS HAND-TITE CHUCK.

Get greater gripping power . . . Better accuracy . . . Longer life with Jacobs' New Rubber-Flex Collet Chucks.

Exclusive, bonded rubber-and-steel construction . . . no loose jaws . . . no springs . . . not harmed by oils or coolants. Real precision chucks at popular prices. *See them at your local hardware dealer's.*

IF IT'S A JACOBS . . . IT HOLDS

HEX-KEY CHUCK . . . fits drill press spindles — motor shafts — jack shafts. With Morse taper arbor, fits lathe headstock, tailstock. 4 models, capacities to ½"; fits ½" or ⅝" shafts.

HAND-TITE CHUCK . . . fits hand tools and power tools with threaded spindles . . . used on polishing heads, bench grinders, flexible shafts, etc. 3 sizes . . . capacities to ½". Models to fit ⅜-24, ½-20 and ½-24 threaded spindles.

ONLY

Jacobs Chucks

FOREMOST IN CHUCKS • FIRMEST IN GRIP

Have The Rubber-Flex Collet
Its Parallel Bite Holds True And Tight

The JACOBS MANUFACTURING COMPANY
200 Jacobs Road, Hartford 2, Conn.

Please send me your new illustrated folder on the Jacobs Rubber-Flex Hex-Key and Hand-Tite Chucks.

NAME.....

STREET.....

CITY.....ZONE....STATE.....

Copyrighted material

Announcing SHAPER and MOLDING *Cutters* FOR ALL MAKES OF DRILL PRESSES!

NO SET SCREWS TO LOOSEN! BLADES AUTOMATICALLY ADJUSTED. CANNOT SLIP OR FLY OUT!

OTHER EXCLUSIVE FEATURES

Blades instantly replaceable—automatically drop into position—cannot loosen or fly out . . . quickly rehoned or reground. Variety of blade shapes for varied contours. Balanced, concentric, built for lifetime use. One locking nut only. Fits tapered, threaded, or ½" I.D. spindles. Specify type and size spindle.

$9.00

Complete as illustrated with 3 sets of blades. Full Money-Back Guarantee

$7.95

ALL-METAL SHAPER FENCE

For use with shaper and molding cutters, planers and drum sanders. Fits all drill presses and shapers. Complete—with tempered hold down springs. Fully rust proofed. A real buy.

2½" DRUM SANDER

$3.95 with 5 Sleeves

ROTARY WOOD PLANER

Most sensational, versatile drill press tool ever built. Planes, trues-up, tenons, panels, rabbets, grooves, beads, bevels, etc. An all purpose, lifetime tool. Complete. **$7.50**

4" ROTARY SANDER

Sands wood and plastic surfaces to agate smoothness. Available for hand drills, flexible shafts and drill presses. Two size arbors ¼" or ½". Complete with 20 discs. **$5.95**

FULL 10 DAY MONEY-BACK GUARANTEE

FREE Workshop Catalog →

BARRON TOOL COMPANY, INC,
270 Architects Bldg.: Detroit 1, Mich.

BARRON PRECISION WORK SHOP TOOLS

WORLD'S LOWEST PRICED ADDING MACHINE

VEST POCKET SIZE

IDEAL FOR BUSINESS OR PERSONAL USE

FREE TRIAL
ONLY **$2.95** TOTAL COST
SEND NO MONEY

FREE!! Each Baby Calculator in Beautiful, rich-looking Leatherette case—at no extra cost.

Fits vest pocket or purse. Guaranteed accurate. Operated as easily, and as reliable, as machines costing many times as much. Not a toy. **Precision made, very durable—guaranteed for life against defects in construction.** You positively can't buy a calculator of equal quality for as little money. **ACCEPTED AS THE FINEST LOW PRICED CALCULATOR FOR OVER 35 YEARS!** Operates with a flick of your finger. Adds, subtracts, multiplies, divides—counts up to one billion. Pays for itself over and over in mistakes avoided, and time saved. **MAKES IDEAL GIFT.**

Sold on a positive money back guarantee. Send only $2.95, Calculator sent postpaid, or send name and address and pay postman $2.95 plus postage. **MONEY BACK IN 10 DAYS IF NOT DELIGHTED!** (If outside U. S., send $3.50.) **AGENTS WANTED.**

CALCULATOR MACHINE CO., (Mfrs.)
Dept. 500, P. O. Box 248, Glenview, Illinois

WAR SURPLUS BARGAINS

9 Piece Spark Plug Socket Set

Mfg'd. by Duro Chrome, ½" Drive, 12 pt. extra deep to reach deep recessed spark plugs, also ideal for other work where a long reach is necessary. Sizes ½", 9/16", ⅝", 11/16", ¾", 25/32", 13/16" and ⅞". Also ell handle and metal box. Each..... **$4.25**

Send check or money order, we pay postage or C.O.D., plus postage.

INDUSTRIAL SUPPLY COMPANY | 312 EAST 33rd ST. NEW YORK 16, N. Y.

---

83 OPERATIONS $34.95

10 DAY FREE TRIAL

HEAVY DUTY WORKSHOP

Do woodworking—have fun—make money! 5 power tools in **one unit:** lathe, drill press, circular saw, grinder and sander. **Complete, only $34.95.** Does heavy, expert work—83 different operations. Uses ¼ h.p. motor. Send $17.50 (balance c.o.d.) on **FREE trial, money-back guarantee.** Or write us today for FREE illustrated literature.

EMRICK, INC., 1755 Clinton, Kalamazoo, Mich.

5 Power Tools in 1

Get A SEAMAN ROTARY TILLER

Better Yields—Better Crops

Because this farm-size rotary tiller prepares seedbeds most ideally suited to your soil and crop conditions, it helps produce *higher yields* and *better quality* crops. Can be adjusted for fine pulverization, coarse or medium tillage . . . just the way you want it. Mixes fertilizer and humus into the GROWING AREA of seedbed; aerates soil; eliminates air pockets and hard plow soles; conserves moisture; promotes earlier and more complete germination of seed; helps to destroy many crop pests and certain varieties of fungus; provides effective weed control; reduces erosion . . . all with ONE machine!

SEAMAN ROTARY TILLERS are available in power take-off and motorized models 3 to 7 ft. tillage widths. See your Seaman dealer and write for complete information.

SEAMAN MOTORS, Inc. 365 N. 25th Street Milwaukee 3, Wis.

BUILD YOUR OWN TRAILER

NEW AXLE AND WHEELS

IMMEDIATE DELIVERY

10% With Order—Bal. C.O.D.

$26.35 Without Tires or Tubes

$58.00 With First Line 6:00 x 16 Passenger Tires and Tubes

- TIMKEN BEARINGS
- 59" TREAD—DEMOUNTABLE WHEELS
- 1½" SQUARE AXLE TESTED 4,000 LBS.
- 16" DROP CENTER WHEELS

STANDARD EQUIPMENT CO.
999 2nd Ave., S.E., Dept. P.S., CEDAR RAPIDS, IOWA

Copyrighted material

GET MORE FROM YOUR HOBBY WITH A *SPEED GRAPHIC!*

Do you have a model train-set panorama you'd like to photograph? How about that sculpturing you do? Or model planes? Or ships? *Whatever* your hobby, you can make it more enjoyable by taking sparkling photos of your best work for your den . . . any other room in the house . . . or for showing your friends! Close-ups are a cinch!

And the SPEED GRAPHIC is the *easy* way to get more from your hobby. It's the one camera you can count on for taking pictures under *any* circumstances, of *any* subject! See your dealer today! Or write for free booklet to Room 30, Graflex, Inc.

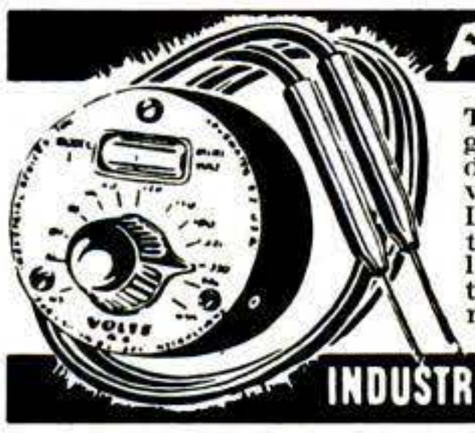
GET PRIZE-WINNING PICTURES WITH

GRAFLEX

Rochester 8, N. Y.

Western Division Office, 3045 Wilshire Blvd., Los Angeles, Cal.

FLASH THAT VOLTAGE



Turn that knob. Extinguish the neon glow. Instantly read voltage right off dial. MINI-VOLT measures 65 to 660 v. AC. Also DC. Tells whether AC or DC. Virtually burnout-proof. Guaranteed for 10,000 hours' operation. Bakelite case. 12" flexible test leads and test prods. A "must" in electrical and radio work. Only $2.50 postpaid!

INDUSTRIAL DEVICES, INC., EDGEWATER 2, N. J.

BUILD YOUR POWER TOOLS

WITH OUR GUARANTEED INDUSTRIAL

POLY BALL BEARING ARBORS

(No extra charge for left hand threads) ORDER NOW!

C4-1/2x12 1/2 spindle, housing 2x8 $7.95 pp.
C5-5/8x12 1/2 spindle, housing 2x8 $8.25 pp.
C6-3/4x12 1/2 spindle, housing 2 1/4x8 $9.25 pp.
D8-1x17 1/2 spindle, housing 2 5/8x11 $17.00 pp.

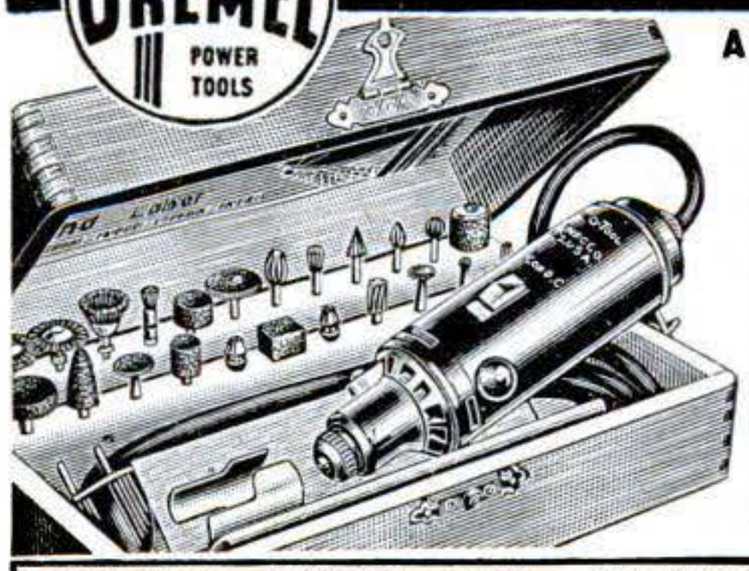
New Departure Self Lubricating Bearings

Complete Line of Shaper Arbors Also Available.

POLY PRODUCTS, 2032-B E. Walnut, Pasadena 8, Calif.

ELECTRIC **DREMEL** POWER TOOLS

MOTO-TOOL ★ THE "POCKET-SIZE" MACHINE SHOP



A TESTED TOOL THAT PACKS YEARS OF PLEASURE

If you get a kick out of making things, you'll have fun with a Moto-Tool. It grinds, drills, routs, carves, polishes . . . does work better, faster . . . on practically any material. Moto-Tool is backed by 10 years of successful industrial service . . . also used by every branch of the Armed Forces. Compare Moto-Tool with other grinders and see for yourself why it's better.

10 Reasons Why Moto-Tool's a Better Buy

Oil-less, sealed bearings ● Patented automatic chuck lock pin ● Oversize armature shaft; hardened, ground, polished ● 110 Volt. AC-DC motor ● Sliding snap-type switch ● Handy hanger hook; cord protector ● Shock-proof bakelite housing ● Dust-filtered air-cooling system ● Dynamically balanced for vibrationless operation ● Weighs only 13 oz.

Approx. 27,000 R.P.M.

PRE-WAR PRICES STILL PREVAIL

Moto-Tool Kit No. 2, with 23 accessories **(high speed steel** cutters, grinding wheels, polishing accessories) and heavy-duty professional Model 2 Moto-Tool in natural-finish, hardwood case **$23.50** (Items purchased separately would cost about $30.00; you save $6.50.)

Moto-Tool No. 2, with one emery point **$16.50**

Moto-Tool Kit No. 1, with 34 accessories and Model 1 Moto-Tool in wood case . . . **$17.50**

Model 1 Moto-Tool, with one emery wheel point **$9.85**

MONEY-BACK GUARANTEE

Buy Dremel Moto-Tools from your dealer. If he cannot supply you, order direct from the factory on 10 day trial, money-back guarantee. Shipped postpaid for payment in full (send check or money order); or send only $2., we will ship C.O.D. You pay postman balance plus postage. Catalog of Moto-Tools and Accessories FREE.

DREMEL MFG. CO.
Dept. 128-E Racine, Wisconsin

New DREMEL DRILL PRESS

ONLY $9.95

(Less Moto-Tool)

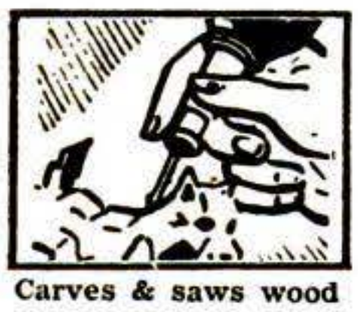
Here's a portable, precision drill press at an amazingly low price. Just the thing for creating costume jewelry, model making, wood carving, routing, etc. Utilizes Model No. 2 Moto-Tool, which can be raised or lowered, swung in any direction, or quickly removed for off-hand use. Drill Press stands 12" high. Base is 6 3/4" x 4". Weighs approximately 3 1/2 pounds.

Copyrighted material

36-PAGE CASCO PROJECT BOOK! YOURS FOR 10¢

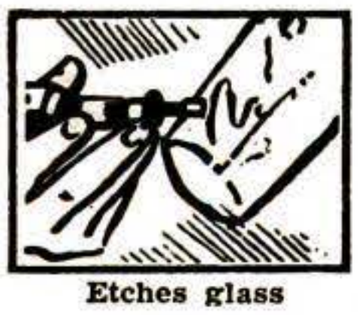
Gives you plans and diagrams for wood, plastic, metal, glass! 5-pages on internal carving of plastics! Full of ideas for gifts, hints for model builders, ways you can make money in spare time!

Drills & routs metals



Carves & saws wood

Shapes plastic



Etches glass

Polishes and grinds

Sands and sharpens

DON'T MISS THIS BIG CASCO OFFER!

"Things to make and how to make them" is a 36-page Project Book no craftsman should be without. Now you can get your copy—just for the dime it costs to cover handling and mailing! This helpful book also tells you about an easier, faster way to get professional results on any project you start!

IT'S CASCO's BIG NEW 21-pc. ELECTR-O-TOOL KIT...

Value-priced portable workshops that belong on every work bench!

Only famous Casco gives you a heavy-duty electric power-head, all the popular accessories, and a sturdy carrying case for this amazing low price! *Now on sale at all leading stores!*

First choice with craftsmen! Every Casco kit is precision built, laboratory checked — proved in exhaustive tests by professionals in industry. Genuine fractional HP AC-DC motor. Smooth vibrationless operation at 20,000 RPM. 14-part ribbed commutator turned within .0005. Handles like a pencil—on-off switch for one-hand control. Oiless bearings. Unbreakable Tenite plastic case. Special safety sleeve and shaft lock. Non-slip chock. Triple cooling for steady performance under load. 90-day guarantee. Complete facts in Casco PROJECT BOOK. Write for yours now!

FILL OUT! GET YOUR PROJECT BOOK!

Casco Products Corp., Dept. S5, Bridgeport, Conn.

Enclosed is 10¢ to cover cost of mailing my 36-page Casco PROJECT BOOK. My hobby is _____

Name _____

Address _____

City _____ State _____

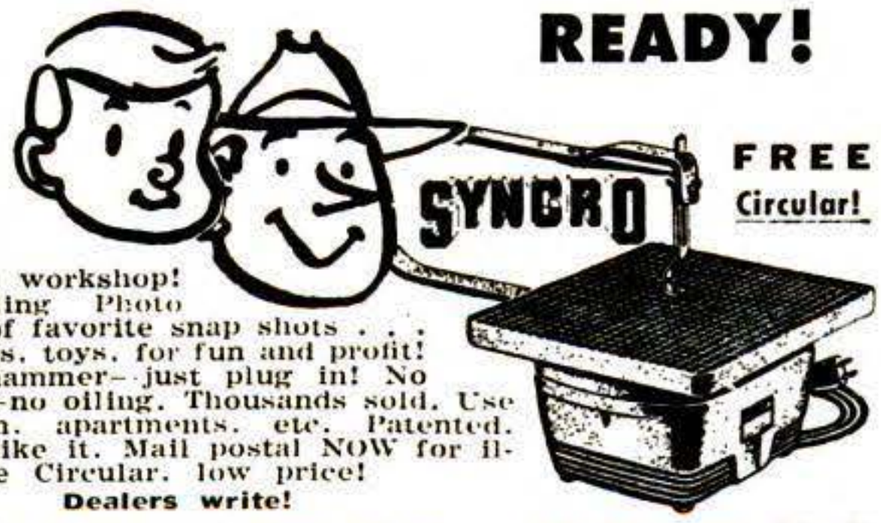
A TOOLSHOP IN YOUR HAND

THERE'S ONLY ONE GENUINE HANDEE

First tool of its kind—today's finest. Smooth, steady power at your fingertips. Easy to handle. Make ship, plane and train models, bookends, costume jewelry. Grinds, drills, polishes, routs, carves, sands, saws, engraves on metal, wood, plastic, glass, leather, etc. 25,000 r.p.m. AC or DC. Wt. 12 oz. With 7 accessories $20.50. In case with 40 accessories $27.50. At stores or sent postpaid. A fine gift for a friend or yourself. CHICAGO WHEEL & MFG. CO., 1101 W. Monroe St., Dept. PO, Chicago 7, Ill. Free 52-page manual.

HANDEE TOOL OF 1001 USES

NEW FAMILY SAFETY-JIG SAW READY!



At last—a revolutionary, new electric jig saw small children may use, yet powerful enough to be the basic tool in Dad's workshop! Make "Standing Photo Silhouettes" of favorite snap shots . . . fancy what-nots, toys, for fun and profit! Handy as a hammer—just plug in! No motor to buy—no oiling. Thousands sold. Use in living-room, apartments, etc. Patented. Nothing else like it. Mail postal NOW for illustrated, Free Circular, low price!

FREE Circular!

Dealers write!

SYNCRO SAW CORP. Dept. B-58 ROCHESTER, MICH.

USE THE WIND TO CHARGE BATTERIES

6 VOLT WIND DRIVEN GENERATOR

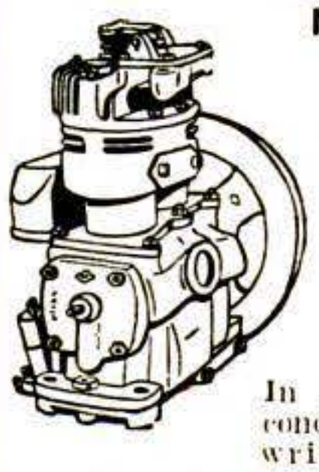
Ideal for farm and camp lighting—for boats, motorcycles, autos, farm radios, etc. The wind driving the propeller operates the generator. Produces 6 volts, 12 amps—weighs only 8½ lbs.

OPERATE WITH PROPELLER OR PULLEY

May be used with propeller as illustrated—with homemade propeller or pulley. For farm lighting plants using batteries it may be run direct by windmill. Use pulley for autos, boats, etc. Fitted with break to control charging. With 13 inch propeller as shown, each $22.95. Generator only, less propeller $14.95. Shp. wgt. approx. 12 lbs. F.O.B. Houston. Send check or money order. Immediate shipment.

AERO PARTS SUPPLY, Dept. PS5 8242 Travelair Blvd. Houston 17, Texas

AIR COMPRESSORS



Model 2-U-S-4-V-A Bendix-Westinghouse 4 cu. ft.

Govt. Surplus, 2 cylinder Bus and Truck Type. Ball bearing crank shaft. Pressure feed oil system. Positively one of the finest and most accurately built air compressors on the market.

Original Cost Over $140.00

In good operating condition with 30 day written guarantee **$34.50** Special Low "as is" price **$29.50**

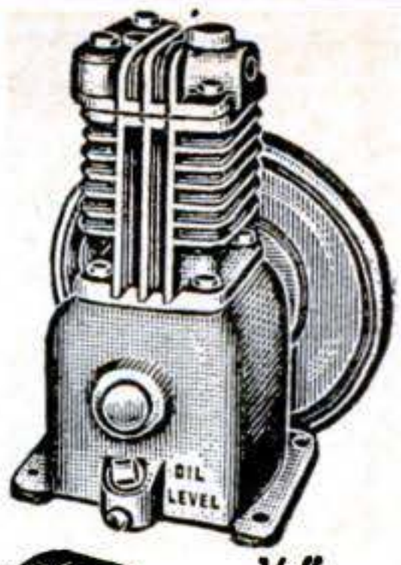
Accessories available for compressors, air regulators, safety valves, air gauges, control governor, misc. fittings, hose, paint guns. Write for Prices and Catalogue.

MIDWEST SURPLUS SALES CO. 2531 Indiana Kansas City, Mo.

Copyrighted material

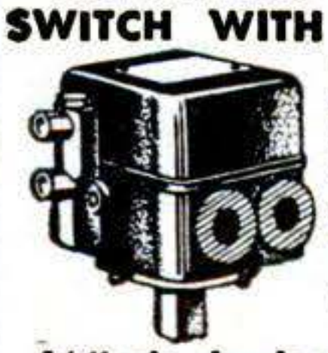
AIR COMPRESSOR
AT A BARGAIN

Piston type, size 2 x 1¾, head in valves, bronze bearings, splash lubrication, "V" Belt drive. Intake muffler and cleaner. Capacity 2.8 c.f.m. at 100 lbs. continuous pressure or 150 lbs. Intermittent, with ½ HP motor. Can be used with ¼ HP or ⅓ HP at lower speed. Weight 14 lbs. Operating instructions furnished.



Immediate delivery. **Price only $17.95**

AUTOMATIC PRESSURE SWITCH WITH UNLOADER



125 to 150 lb. Pressure.
Use with ¼ to 5 HP Unit.
Only **$8.95**

¼" air check valve . . . $2.50
½" air check valve . . . 4.25
2½" air gauge, 160 lb. 1.75
¼" safety valve, 125 lb. 1.50

Prices are F.O.B. Chicago. Immediate delivery. **SOLD ON MONEY BACK GUARANTEE.** Send check or money order today.

DEALERS — WRITE . . .

¼" REDUCING VALVE & GAUGE

$5.75

Oil resistant, pressure 0-to-200 lb. Reduced pressure 0-to-75 lb.; 3 outlets ¼". Wt. 2 lbs.

C & M EQUIPMENT COMPANY 1831 S. State St., Dept. B-5, Chicago 16, Ill.

SALESMEN
$240.49 in One Week
Unusual? . . . Not At All!

Just Look at One Week's Earnings of These Representatives:

WWS $290.99, JMH $229.75, RJR $262.47, VJM $275.95, JEA $240.49, RWF $231.21. ● Direct mail campaign brings hot leads right into your home. Remarkable product does part of 10 men's work; a *natural* during these labor problem days. Has perfect sales story; and sells year 'round. As modern as radar! Special demonstrator offer. We extend credit, deliver, collect. No capital required; no experience needed. You make big profit on first sale, and full credit on repeat business. Every business, store, factory, etc. are prospects.

Write **JOHN PORTER, 2433 Indiana Ave., Dept. 332 Chicago 16, Ill.**

• LEARN FLOCK FINISHING •

FLOK-KRAFT is the proven professional method by which you can spray flock finishes on radios, book ends, car dashes, etc., for PROFIT. **Earn Big Money.** Complete kit including spray gun and all necessary materials for just **$7.95,** postpaid. Order direct. FREE SAMPLE and illustrated folder.

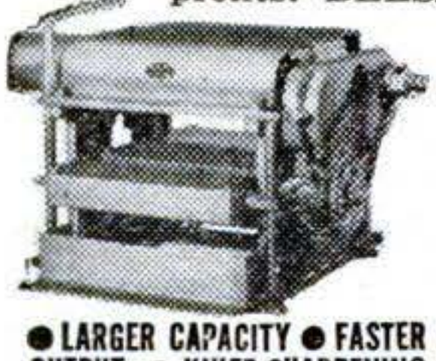
COAST INDUSTRIES, Dept. 24S, 1509 W. Manchester, Los Angeles 44, Ca

---

FASTEST PLANER in the WORLD at this Low Price ... $195.00

BELSAW Multi-Duty Planer!

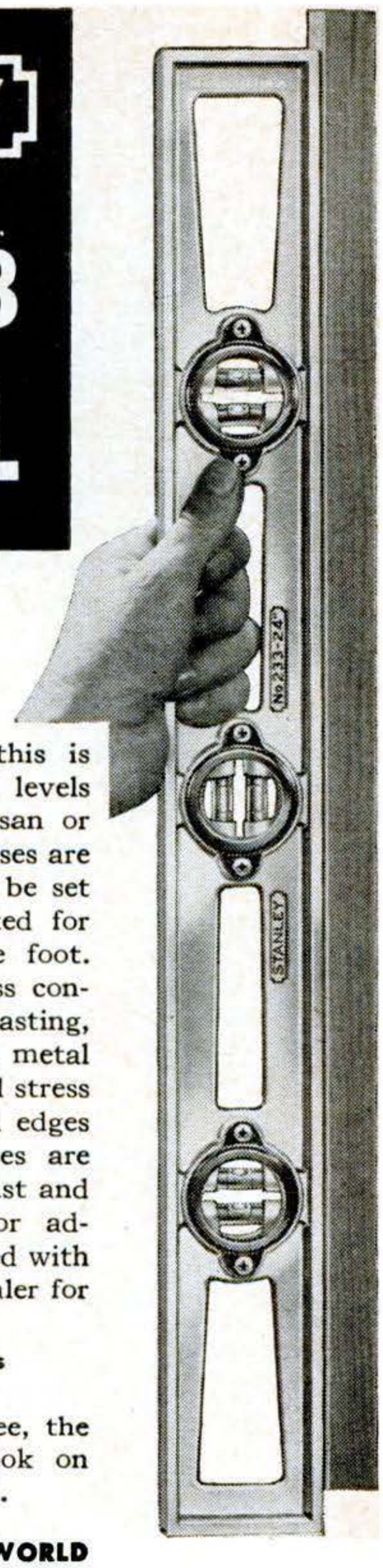
Speed up production! Increase your profits! BELSAW power self-feeds at 24 feet per minute...The lowest-priced surfacer that will handle 12 x 6 in. stock. Planes green or dry sawed lumber into smooth, worked forms. Three high-speed steel knives make 42 cuts per inch. Multi-duty BELSAW takes inexpensive attachments for all planing mill operations — Jointing, Rabbeting, Grooving, Matching. BELSAW is the ***only*** 12 in. planer providing ***attachments for jointing and grinding its own knives.*** Start planning NOW for BIGGER VALUE and BETTER PERFORMANCE, with BELSAW. Write for FREE specifications, illustrations and low prices.



● LARGER CAPACITY ● FASTER OUTPUT ● KNIFE SHARPENING ATTACHMENT

BELSAW MACHINERY CO B-1026 Field Bldg., 315 Westport Rd., Kansas City, Mo.

STANLEY
No. 233
LEVEL



Made of aluminum, this is one of the most useful levels on the market for artisan or home owner. Its six glasses are fully adjustable — can be set at any angle or adjusted for degree of pitch to the foot. Frame is a strong, truss construction, aluminum casting, light in weight. Extra metal around glasses and at all stress points. Square ends and edges for scribing. Level cases are gasketed to keep out dust and moisture. Directions for adjusting glasses are packed with each level. Ask your dealer for Stanley No. 233.

Send coupon for this BOOK BARGAIN

Two books . . . one free, the other a famous textbook on woodworking for just $1.

THE TOOL BOX OF THE WORLD

STANLEY
Reg. U.S. Pat. Off.
HARDWARE - HAND TOOLS - ELECTRIC TOOLS

Stanley Tools, 258 Elm St., New Britain, Conn.
Please send by return mail:
☐ FREE booklet: "The Joy of Accomplishment".
☐ 188-page book: "How to Work with Tools and Wood". $1.00 enclosed.

(In Canada: Send order to Stanley Tool Co. of Canada, Ltd., Roxton Pond, Quebec.

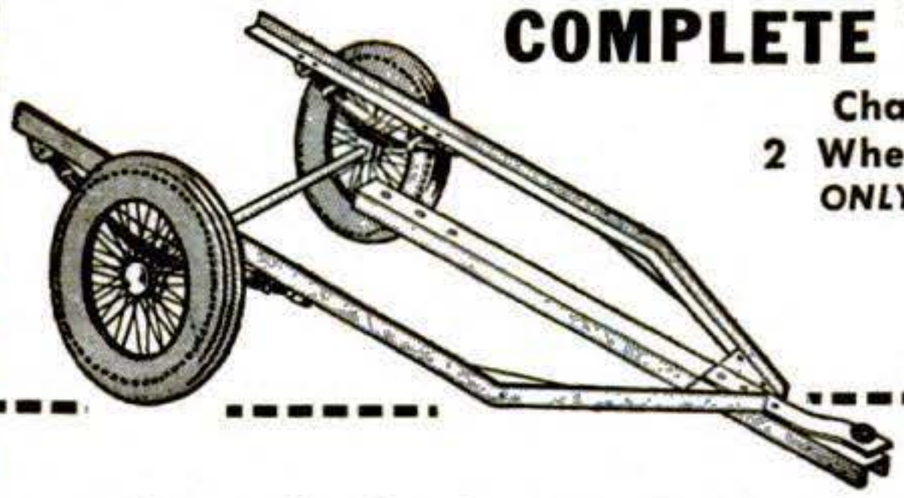
Name . . . . . .

Address . . . . . .

City . . . . . *State* . . . . . .

Copyrighted material

COMPLETE TRAILER



Chassis-Axle
2 Wheel Assembly
ONLY **$52.50**
Shipped KD., F.O.B. Yonkers or send $10 & bal. C.O.D.

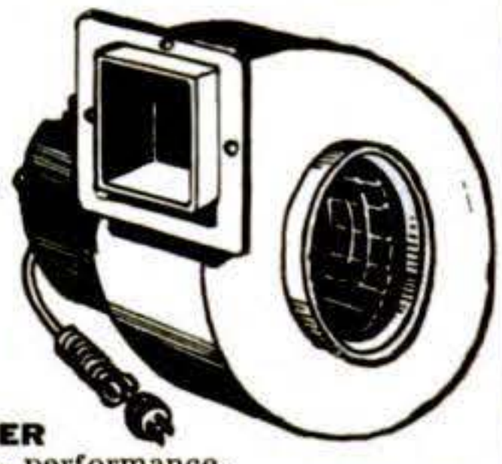
Never before offered at this low price. Tested to carry 1000 lbs.—built to take hardest usage . . . **COMPARE!**—in construction-utility-value! You'll agree there's nothing like it.
YOU GET: Complete draw bar assembly, chassis of steel angle, 2 automobile type springs; 2 wheels with Timken roller bearings take standard 4.75 x 19 tires, 2 hub caps and grease rings . . . 91" Overall, 57" Tread. Less Tires, Tubes.

Complete wheel, hub assembly & bearings $9.00 ea.

BEST BENCH VALUE ON MARKET.
Solid, tough wood construction—**ALL STEEL LEGS.** Very large drawer, tool rack, shelf. 34½" high, 59" x 23". **COMPLETE WITH ALL HARDWARE.** Shipped KD with easy instructions. **ONLY $15.35 F.O.B., Yonkers.**

HEAVY CAST ALUMINUM BLOWER

Now Only **$10.00**



SINGLE EXHAUST BLOWER DELIVERS 100 CU. FT. AIR PER MINUTE. Ready to install yourself with any household tools. It's built for that. Housing is solid cast aluminum to last indefinitely. 110 V., 50-60 cycles. Cont. duty motor.

DOUBLE EXHAUST BLOWER
Same wonderful construction, performance, easy installation as the Single. Adaptable for any Blower need. **ONLY $15.85.**
On Blowers, add 50c for handling. $1 west of Mississippi.

Universal Column Jack
with the overlapping pin that reinforces the telescopic joint . . . Raises, levels, supports sagging floors.
3'8" to 5'7" **$6.95**
5'7" to 8'4" **$7.95**
18" to 37" **$4.95**

MIKE
Designed especially for speech . . . amateurs, P.A., recording . . . High impedance, output 54.2 db below 1v per bar. All chromium plated; rubber covered, shielded cable. 8' cord. Remove from base for hand use. **We know it's so good, we sell it on 5 day, money back guarantee!** Ship. wt. 2 lbs. **Lists for $10.75. COST TO YOU $4.95.**

Send Check, Money Order on all Items. SATISFACTION GUARANTEED.

UNIVERSAL YONKERS CORP. (S-5) 137 Alexander St., Yonkers 2, N. Y.

SPECIAL BARGAIN PRICES IN
SETS OF CARBON TAPS & DIES

consisting of one each of tap & die 1/72, 2/64, 3/48, 4/48, 5/40, 6/32, 8/36, 10/32, 12/24, (dies 13/16 O.D.) complete with Tap Wrench and Die Stock. **COMPLETE $8.00**
Write for prices & Sizes of individual taps & dies. Enclose 3c for postage.
WE BUY ALL SURPLUS TOOLS
SEND FOR FREE CIRCULAR
SID TOOL CO., Dept. S2, 183 Grand Street, N.Y.C.

BUY BARGAIN BOOK BY C. P. A.
Become lightning calculator and mental wizard. Get MENTAL MULTIPLICATION, 50c postpaid.
LIPKIN, Dept. PS, 249 W. 34th, New York 1

ADHESIVIZED SUCTION CUP
Use wherever a nail is impractical. Clings tightly to any smooth surface. Wet and apply. Button type fits into keyhole slot. Ten cents each. 10 for $1.00.
F. C. BRAUN 940 Metcalf Ave. New York 61, N. Y.

Say You Saw
It In Popular Science

New Precision Built Commercial
Wood Shaper and Matcher
Now Within The Reach Of Every Home Workshop

Make corner matched joints, panelling, fluting, routing, notching, inlay, tongue and groove and joints. Designed for commercial use, now simplified design and mass production brings it within the reach of every one. Just attach in chuck of drill press and it's ready to use. Write for complete FREE information.

Write for FREE information **T & H Mfg. CO.** 811 East 31 St. Dept. PS-1, Kans. City, Mo.

HIGH PRESSURE HYDRAULIC PUMP
FOR HOME, SHOP AND FARM USE

Genuine Vickers constant displacement high pressure pump. Use it for any type of liquid pumping job. Will pump 400 gal. per hour at 3750 R.P.M. Precision piston type design provides 1000 lbs. per square inch pressure. Self priming. Standard thread ¾ inch intake and discharge ports. With ⅝ inch splined shaft—just add pulley and power and you're ready to go.

HAS HUNDREDS OF USES
These pumps are brand new. Original acquisition cost approx. $100.00. Can also be used as hydraulic motor; for rams, opening doors, hydraulic lifts, etc. —also for any liquid transporting job. War surplus, but brand new. Shp. wgt. 7 lbs. Send check or money order. Satisfaction guaranteed. Each only..... **$9.95**

SOUTHWEST AERO SUPPLY, Dept. PS5
Drawer 488 South Houston, Texas

The New Improved All-Purpose
DYNAMIC Super Charged ARC WELDER
Industrial Transformer Type

IT WELDS ● IT BRAZES ● IT SOLDERS

IDEAL FOR AUTO—HOME APPLIANCE AND FARM REPAIRS. This portable, industrial transformer type welder easily carried right to the job **can be operated from any convenient** properly wired **110 Volt 60 Cycle Line.** Can also be supplied for 220 volt 60 cycle operation and other voltages and cycles at slight additional cost.

EASY-TO-OPERATE. If inexperienced you can easily learn to do a variety of high grade welding jobs by following the practical, simplified **Welding** and **Operating Instructions furnished.** Once you see the **DYNAMIC WELDER** in operation you won't want to be without it. Its simplicity will amaze you. In a year the **DYNAMIC** only costs you about 7c a day. Comes complete ready to operate with helmet, rods, cables, holder, operating and welding instructions, etc.

SAVES YOU VALUABLE TIME AND MONEY!

DESIGNED TO DO HIGH GRADE WELDING inexpensively—Maintenance Men, Farmers, Mechanics, Machine Shops, Foundries, Auto, General Repair and Job Welding Shops, all using the **DYNAMIC** find it so indispensable and useful that they can not afford to be without it. **Works on Iron, Steel, Brass, Bronze and Other Metals.** Has 8 metallic and carbon arc heat stages. Does work you would think only possible with a larger, more expensive machine.

ONLY **$28.50** COMPLETE

Do Your Own Welding
Write for Particulars!
Get Details on Our 10 DAY TRIAL Offer
Member Chicago Association of Commerce.

Agents Wanted
Make Big Money
WRITE FOR PARTICULARS

DYNAMIC WELDER CO., 15 East 23rd Street, AG, CHICAGO 16, ILL.

Copyrighted material

SAVE UP TO 85% in WAR SURPLUS...SENSATIONAL VALUES at "GADGETEER'S HEAVEN"

IN MANY ITEMS WE HAVE THE WORLD'S LARGEST SUPPLY

NEW HYDRAULIC CYLINDERS, VALVES, PUMPS, FITTINGS, HOSE & TANKS

51 sizes & types.
World's Largest Supply
1001 Labor Saving Adaptations for pulling, pushing, lifting operations. Finest precision workmanship and materials. Liquid and or air operation, developing terrific power.
20,000 Available WRITE FOR CATALOGUE
PRICED TO SELL AT 15% GOV'T. COST.

WINCH HOIST

20 ft. 1/4" Alloyed Steel Cable with Hook, mounting, Frame 15" x 12" — Babbitted bearing Housings — 1" O D Alloyed steel tubular frame for versatile attachment. — Cable guide roller pulley for less sening strain.

now equipped with mounting frame, handle, cable, etc. complete.
Thousands of Satisfied Users! Hundreds have written, telling us it's the most wonderful tool in the world!
Capacity 2500 lbs. 20-1 ratio Bronze Worm Gear
Ideal for Garages, Truck loading, Machine Shops, Boat Builders, etc. $14.59 ea.

PNEUMATIC AND AIR TOOLS

10,000 in various popular makes, sizes, types, Cleco, Aro, Ingersol Rand, Chicago, Pneumatic, Buckeye, etc.

RIVET GUNS Pistol & Gooseneck Type
#180 Gooseneck — 101 Uses, Chipping, Riveting, Hammering, Breaking cement and auto body work.
#181 Pistol
Chicago Pneumatic, Cleco, Ingersoll Rand E3, E2, 3X, 2X, OY
$55 Value
$8.95

#186 Squeezer — PNEUMATIC ALLIGATOR SQUEEZER $80 Value #186 $15.95

PUMPS

HYDRAULIC, VACUUM, AIR
For every purpose at 15% of Value.

P-1 Hydraulic Pesco Type
Positive displacement gear type. Capacity: 1 gal. per min., at 1500 R. P. M. at 1500 P. S. I. Operating speed: 3750 R. P. M. Intermittent maximum 4500 R. P. M. Rotation: either direction with slight adjustments. **$9.49**

P-4 VICKERS
Positive displacement angle piston type.
Capacity: 6 gal. per min. at 3000 R.P.M. at 1500 P. S. I.
Operating Speed: 3750 R. P. M., Intermittent maximum 4500 R. P. M. Rotates to right only. **$14.49**

PV-1
May be used as air or fuel pumps for pressure or vacuum.
Will pump 7½ gals. oil at 300 R. P. M. Builds air pressure 30 lbs. per sq. in. at 1000 R.P.M. Vacuum draws 26 in of mercury at 1750 R. P. M. **$9.49**
Vane Type

Here's a Real "Lite Special"

Farm, Auto, New U. S. Navy Portable Pistol Grip, Sealed Beam, 12v. Search Spot, or Emergency. Light - featherweight Gov. $35.00 our price **$2.95**
3 Extra fillers - Red, Green & Amber 93c Set
Extra Seal Beam 95c ea.

AIRFORCE GUNSIGHT #102 $1.95
#102 contains triple Lens. #103A N6A non-glare variable density Lens plus other Lens. Valuable for Photo work $2.55
Lens in these sights are worth many times the entire cost of these items.

GYRO PILOT

Electric GYRO PILOT Assembly Part 2 solenoids for reverse and forward motor control. 2 solenoids throw clutch to engage drive. With brake assembly. Can be used as boat rudder control, converted for lathe tapping and slow speed motor tool. Wt. 29 lbs. Finest precision workmanship.
Cost Gov't. Thousands!
Your Cost _____ $8.95
#513

AIR DRILLS OR MOTOR SPECIAL

Pistol #196
ARO PISTOL or Straight with 1/4" JCB Chuck $12.95
Popular Makes. Angle Drill $15.00
Send for Catalogue and List of Other Sizes, Types of Pneumatic Tools.

JEEP CANS

5 gal. gas or oil, self-locking screw cup type 18" x 6¼" x 13" Wide $1.19 ea.
non-leaking
In lots of 5 $1.09 ea.
25 or more $1.05 ea.
Self locking, flexible screw spouts with brass filter at end. 1" I. D. x 16" lg. 39c

NEW FLEXIBLE GOOSENECK LAMP

110 V. A. C. 13 ft. wire with socket, switch and plug. In mounting bracket suitable for home or workshop.
Wire alone worth our price of 99c each.

PEXTO SIDE CUTTING PLIERS

#121 — Beveled head lap joint. Size 500. Cuts wire, solid grip, alloyed steel. Ideal for home, electrical, or shop use.
A $3.50 value for $1.95

#516 BATTERIES

#515 — NEW! FULL STRENGTH FOR PORTABLE RADIOS, SIGNAL LAMPS, BOATS, ELECTRIC TRAINS, ETC.
#516 9 Volt 8½ x 6 x 4 in. ..... 3 run
24 or 27 Volt motor 79c
These batteries are especially suited to portable radios.
#517 67½ & 1½ Volt Battery ____ 69c
#515 90 & 1½ Volt ____ 69c

DC GENERATOR 140 AMP

#G-1
Direct Current Generator, especially suited for adaptation to homemade welding unit.
A fast moving item at $15.95

NEW PRESSURE TANKS

Stainless steel - Shatter proof. Rustless. 10,000 available in 4 different sizes. 1001 uses.
G-1 12½ x 24 inches - 2100 Cu. In. capacity 29 cu. ft. ____ $4.75
D-2 6½ x 24 in. - 500 Cu. In. capacity - 7 cu. ft. ____ $2.49
F-1 -10" x 18" 1000 Cu. In. Capacity $3.95
F-2 6 x 45 in. - 1000 Cu. In. capacity 14 cu. ft. ____ $3.95
Perfect portable air tank to carry in car or trailer. Ideal for painting cooking, spraying, ocean buoys

All Purpose HAMMER

#109 — PENTCO #107
Ax & hammer combination for wood & metal work. 3½ lbs. 14½" hardwood handle, hard steel cutting edge. 69c

Compound Action METAL SNIPS
Hard steel blades. Expansion spring. Locking device.
Right Hand and Left Hand $2.59

VALUABLE GEARS BARGAINS!

8 to 1 ratio, spindle drive ____ #110 $2.98
6 to 1 with screw shaft ____ #111 $4.98
85 to 1 (can be used for radio, antennae, etc.) #112 $3.95
#G-11 10-1 gear ratio $3.95
2 to 1 ratio 90° right angle #113
10 tooth bevel steel boxed gear $4.95
113a 6 to 1 ratio 90° right angle $4.95
Flexible Gear Shafts With End Drives
115 ——— 30" 69c ea.
115a ——— 60" 99c ea.
Radio tuning shafts that can be used as flex gear drives *115a 12 ft- ½" nut --15 tooth internal spline $1.95 ea.
*115b 25 ft- ½" nut 12 tooth with internal spline $4.25
#115a

Holtzer INVERTER

750-Volts-Amperes
24 Volts - DC
36 Amperes
In 26 Volts - 400 Cycle - Single Phase
250 Volts - Amperes - 40% P. F.
Out 115 Volts - 400 Cycle - Single Phase
500 Volts - Amperes - 90% P. F.
Type MG-149 $9.75 each

FIRE EXTINGUISHER

Kiddie Lux Co2 Type. Built to Gov't. spec. 3½ lb. wirebound shatterproof heavy case 20" x 4". Trigger controlled with horn, fully recharged. 4TB Type.
$30.00 value #301A $11.75
2 LB. CO2 TYPE
$22.50 value #602 $8.75
10 lb. Chgd. CO2 with Horn
$60.00 value #603 $24.50
15 lb. Chgd. CO2 with horn.
$80.00 Value #605 $27.50
NEVER AGAIN A BUY LIKE THIS!
indispensable for small or large planes, trucks, auto, home, factories.

HIGH PRESSURE OXYGEN BOTTLE

New. Will hold up to 3,000 lbs. PSI. with Co2 used as tire inflator or fire extinguisher, with oxygen for sick room or deep-water diving, etc. Completely equipped with brass valve, 36" hose, dial gauge, & canvas bag ____ $1.95 ea.

New Electric Motors

#500 new ½ H.P. 27 Volt D. C. 24 Volt A. C. This motor can be readily adapted to 110 A. C. by the simple method of rearranging armature brush leads. We furnish free diagram of instructions with each order.
A Sensational Value @ $5.95
Converted to 110 AC. Equipped with plug and 3½ ft. heavy duty cord, ready to use on 110 AC house current $8.49
1/6 H. P., 24 Volt D. C. Motor, Series Wound. New. #501.
#501 ____ $3.95 ea.
#502 - 2 H.P., 24 V D.C., M usd. $8.95
#500

FILES

NEW NICHOLSON & KEARNEY & FOOTE CO.
12" Amer. Std. flat 2nd cut dbl. cut sq. edges taprng. sides std. tang New ____ 49c ea
14" Amer. Std., Mill type, bastard sngle. cut. sq. edges, tprng. sds., std. tang new 69c ea
12" Used Vixen Files 39c ea. 10" 29c ea.

CLAMPS

#121 — Adel Aluminum, rubber lined. Mixed. #121 4 dozen ____ 89c
*120 Aero-Seal. Rust Resistant. Slotted with screw gear top. ½" to 3".
#120 Regular 27c now 10c

AIRCRAFT CABLE

Alloyed steel, rust resistant. 3/16" dia 18' ft. long, with turnbuckle ends. 99c ea.
On reels in any length
3/32 ..... 4c Ft. 3/16 ..... 6c Ft.
1/8 ..... 4½c Ft. 9/32 ..... 8c Ft.
5/32 ..... 5c Ft.

BEARING MIX

Needle, ball and roller bearings in excellent assortment. Sizes from 1/2" to 2".
#170 Introducing this treasure shelf assortment of 15 Bearings at ____ $2.95

HOBBYISTS!

An Unequalled Value!
GADGET MIX
Rivets, spacers, Clamps, bolts, nuts, Radio parts, gears, etc.
A gold mine ____ 5 lbs $1.19
#106

RUBBER GOODS

NEOPRENE SHEET RUBBER

	Thickness	Approx. Width	Price per rnng.	yd.
#325	.020"	1/64	36'	.75
#326	.037"	1/32	36"	1.00
#327	.064"	1/16	36"	1.75
#329	.125"	1/8"	46"	$4.75

Item #329 is laminated rubber sheet with cloth center. Flexible but very fine for hvy. wear.

SPRING MIX

Torsion, compression and tension springs. Assorted sizes. #206
2 lbs. 89c
A treasure shelf for emergencies!

PLASTIC PARALLEL STRAIGHT EDGE

with knobs & rubber pads for non slippage on each section. A must for navigators, mechanics, draftsmen, Engineers .. You've never seen 'em at ____ 97¢ ea.
#PA-1 15" length

ORDER DIRECT FROM THIS AD — All sales final. Make remittances by money-order, bank draft or personal check. Purchase orders acceptable from D & B firms. All quotations F O. B Los Angeles.
FREE LARGE ILLUSTRATED CATALOGUE — Send 1/3 deposit with C. O. D.. orders. — Also Complete Aircraft Supplies

PALLEY SUPPLY CO. THE LARGEST FIRM OF ITS TYPE IN THE WORLD

DEPT. P. S. 58 — 6321 SAN FERNANDO RD. GLENDALE 1, CALIFORNIA

Free! New CONCORD RADIO Catalog

The ONLY Complete Up-to-the-minute Catalog of
RADIO PARTS • RADIO SETS KITS • HAM GEAR • TESTERS

The greatest, latest complete presentation of radio, electronic and television equipment and supplies in Concord history! Packed from cover to cover with thousands of items—160 pages of everything in Radio and Electronics. Special bargain section of hundreds of money-saving values. Scores of new items from famous makers. Parts, blueprints **for famous Popular Mechanics and** many other kits. Mail coupon for your FREE copy.

CONCORD RADIO CORP.

CHICAGO 7 — 901 W. Jackson Blvd.
ATLANTA 3 — 265 Peachtree Street
Downtown Chicago Branch: 229 W. Madison
LAFAYETTE RADIO CORPORATION

MAIL THIS COUPON NOW!

Concord Radio Corporation, Dept. 115
901 W. Jackson Blvd., Chicago 7, Ill.
Yes, rush FREE COPY of the comprehensive new Concord Radio Catalog.
Name.....
Address.....
City.....*State*.....

SANDING FASTER and BETTER

NEW POWER KING BELT and DISC SANDER

• Now you can get that professional "factory finish" on your fine woodworking projects — and in minutes instead of hours. This new heavy-duty belt and disc sander has 10″ diameter disc, 4″ belt, precision ball bearings, tilting table. It sands any width boards, angles, curves — metals, plastics. See it at your Power King dealers, or send for illustrated catalog sheets.

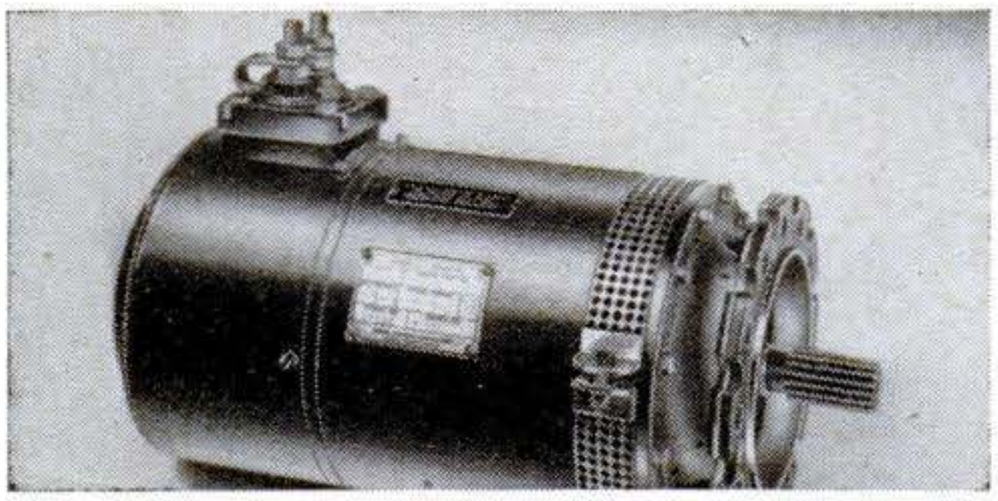
NOW ONLY $57.75 F.O.B. Warsaw less motor

POWER KING TOOL CORP.
535 Cleveland Street
WARSAW, INDIANA
Division of ATLAS PRESS COMPANY

IN ORIGINAL CRATES — BRAND NEW TYPE P2 DC GENERATORS

BRAND NEW—ORIGINAL COST ABOUT $300

NOW WHILE THEY LAST, EACH . . . **$10** F.O.B. Our Buffalo or Syracuse Plants



28.5 VOLTS—200 AMPS. DIRECT CURRENT

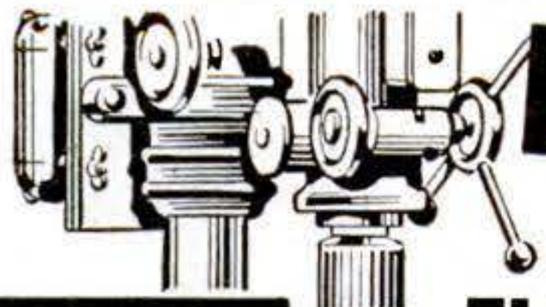
Manufactured by Bendix Aviation Corporation
SPEED RANGE 5000 TO 10,000 RPM

Experimenters, inventors, laboratory workers! Here's your opportunity to pick up a magnificent piece of equipment at about 3% of the original government cost. Net weight 38 pounds. Mail check or money order. Prompt shipment guaranteed.

HURWITZ BROS. INC.

P.O. Box 76, Syracuse, N.Y. P.O. Box 213, Buffalo, N.Y.

Say You Saw It In Popular Science



NEW! HANDY FLEXIBLE SHAFT

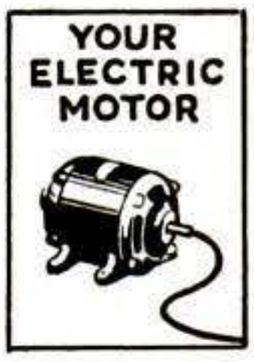
ONLY $2.95

• Converts Any Motor, Drill Press, Electric Drill, Electric Fan Into A Handy Rotary Tool.

• Attach ROTA-SHAFT in a Jiffy. Can Be Used for Grinding, Polishing, Sharpening, Cleaning, Engraving, Marking Tools, Carving, On Metal, Plastic, Wood, Glass.

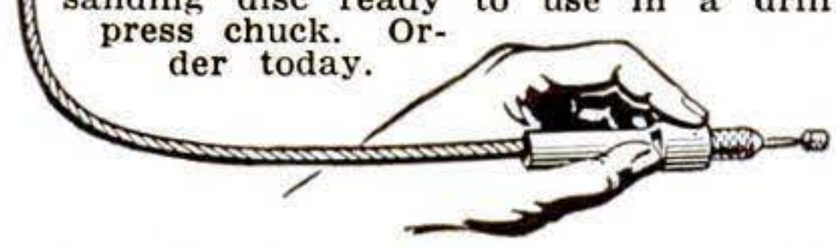
OLD FAN MOTOR

YOUR ELECTRIC MOTOR



VACUUM CLEANER MOTOR

YES! Only $2.95 and ROTA-SHAFT turns your old motor, drill press, electric drill or electric fan (10 inch or larger) with blades removed, into an efficient, versatile Flexible Shaft Tool for doing hundreds of grinding, polishing, sharpening jobs, especially in hard-to-get-at places. Attaches to motor shaft or in chuck. Convenient handpiece for ease of handling. Generous 40-inch overall length. Comes complete with buff and sanding disc ready to use in a drill press chuck. Order today.



SEND NO MONEY! Just mail order. Pay postman only $2.95 plus postage on delivery, or send $2.95 and we pay postage. Try 10 Days—if not delighted return for money-back.

If you order Rota-Shaft for use on motor add 35c for Special Coupling and State Shaft Diameter. MAIL ORDER NOW!

STRADER PRODUCTS CO. Dept. C-102
259 Strader Ave. Cincinnati 26, Ohio

Copyrighted material

Paint Your Own Car in One Hour with the NEW AUTO ENAMEL

YOU WIPE ON *Like Magic* with only a POWDER PUFF

2 YEAR Guarantee LUSTR WIPE

TRADE MARK

Dries in about one hour to smooth, mirror-like professional finish. **GUARANTEED FOR 2 YEARS** not to crack, chip, peel or fade, if simple directions are followed. Lustr-Wipe is NOT a wax or a polish but a marvelous new Auto Enamel.

NO Brushing
NO Spraying
NO Masking
NO Streaks

Follow the simple instructions and LUSTR-WIPE will give your car that new FACTORY-LOOK. Dries dust-free in about an hour. Goes over any color, enamel or lacquer.

ONE QUART PAINTS YOUR ENTIRE CAR ANYONE CAN DO A BEAUTIFUL JOB

LUSTR-WIPE is the easy, speedy, economical, yet most successful way you've ever seen to PAINT YOUR OWN CAR. It's different-works almost like magic! All you need is ONE QUART of LUSTR-WIPE, the Miracle Auto Enamel, and the powder puff we send you AT NO EXTRA COST. Almost ANYONE, can do a magnificent job in about ONE SHORT HOUR. It seems unbelievable but true. JUST WIPE IT ON. No brush needed. No spray required. No masking of any kind. LUSTR-WIPE dries dust-free in about an hour. You'll be amazed—thrilled beyond words with the results! Your friends will think you spent $75 to $125 for a professional paint job. YOUR CAR WILL LOOK "LIKE NEW". Rush your order for a quart of LUSTR-WIPE TODAY.

This Price for Immediate Delivery

SAVE by Ordering NOW! **$3.95 PER QUART** Applicator Furnished

ORDER ONE OR MORE QUARTS TODAY

SEND NO MONEY! ORDER LUSTR-WIPE TODAY!

BLACK	$3.95 per Qt.
GREY (Gunmetal-Dark or Air Wing-Light)	3.95 per Qt.
GREEN (Brewster-Dark or Jewel-Light)	3.95 per Qt.
BLUE (Washington-Dark or Monticello-Light)	3.95 per Qt.
RED or MAROON	3.95 per Qt.

Order one quart or more today! **SEND NO MONEY!** Mail penny postcard. Then pay postman for **LUSTR-WIPE** plus postal charges. Or, if you send money with order, **WE** pay postage. See your dealer or order direct.

Send for free details of powerful money-making plan. Why wait? The weather is ideal for painting cars. **START NOW BY ORDERING ONE OR MORE QUARTS OF LUSTR-WIPE TODAY!**

MAIL COUPON TODAY! SEND NO MONEY!

AGENTS WANTED FOR NEW MONEY-MAKING BUSINESS!

CAN MAKE GROSS PROFITS UP TO $275.00 IN ONE WEEK.

Go into business for yourself selling LUSTR-WIPE in cans, or painting cars yourself or having others to do the work. Owners of old cars everywhere (who can't get new cars) are easy prospects. Send now for our MONEY-MAKING PLAN.

DISTRIBUTORS WANTED: A few wonderful territories now available. Write at once for our SPECIAL OFFER.

LUSTR-WIPE CORP. 166 W. Washington St. Dept. E, Chicago 2, Ill.

LUSTR-WIPE CORP. 166 W. Washington, Dept. E, Chicago 2, Ill.

Please send me _____ quarts of LUSTR-WIPE AUTO ENAMEL at the special price of $3.95 per quart.

COLOR _____

☐ Send Postpaid. Full Payment $ _____ enclosed.

☐ Send C.O.D. plus Postal charges.

NAME _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

☐ Send information regarding AGENT PLAN.

☐ Send information regarding DISTRIBUTORSHIP.

Copyrighted material

TO: Reader
FROM: Editor

EASILY MADE SEISMOGRAPH

Built like a pendulum, the instrument is amazingly sensitive to faint shocks, but not to nearby traffic

By Roy H. Baldridge

Mike Lubin, Staten Island high-school senior, shows the seismograph that helped him place in finals of national scholarship contest. Mike used plans first published 13 years back, in November 1935 issue of Popular Science (inset above).

A Good Idea Never Dies

PS ARTICLES seem to live on forever. By now we're accustomed to requests for reprints of stories that appeared 10 or even 20 and 50 years ago. But it was a pleasant surprise to discover that plans published in Popular Science way back in 1935 helped a young high-school senior place in the finals of the Westinghouse Science Talent Search.

Michael Lubin, of Staten Island, N. Y., was barely old enough to be trusted with a screwdriver when Roy H. Baldridge's article on a homemade seismograph appeared in this magazine. He came across it while seeking a suitable project for the scholarship contest, and as the illustrations show, closely followed the 13-year-old PS plans. Mike made practically every part of the earthquake-measuring instrument in the basement shop he shares with his kid brother and his father, an accomplished craftsman.

The seismograph is now set up in a cramped storage room adjoining the Lubin cellar. It consists of a pendulum (a lead-filled tin can hung on fine wire) supported by a steel bar sunk in concrete. When earthquake tremors shake the concrete and steel support, the heavy pendulum bob moves less than the support rod because of the bob's inertia. This difference in movement is magnified by a long arm that makes wiggly lines on the smoked paper of a recording drum. The recording drum is simply an orange-juice can rotated on a geared shaft by an instrument motor. Mike's seismograph, while no rival of expensive laboratory instruments, is so sensitive that it has picked up an earthquake in Fairbanks, Alaska—3,300 miles away.

Popular Science shares Mike Lubin's pride in his achievement. And while he works hard at becoming a physicist, we'll work hard at more articles that live on forever—whether they win prizes or just serve as handy reference to keep around in case something goes wrong with the plumbing.

Martin Mann

Copyrighted material

LET YOUR SEALED POWER FRANCHISED DEALER HELP YOU

"GET THAT NEW-CAR FEEL" AGAIN!

NOW—after a hard winter—have your Sealed Power Franchised Dealer give your engine a thorough check-up. He can help you get that NEW-CAR FEEL again, right now! And you will get more mileage on gas and oil.

You remember when that car was new—how you thrilled to that surge of eager power. That's the NEW-CAR FEEL. Let your Sealed Power Dealer restore it to your old engine.

He has a set of Sealed Power Piston Rings specifically engineered to do the best possible job in your engine, whatever the make, model or cylinder wear condition. When he installs new Sealed Power Rings and overhauls your engine, you will know that NEW-CAR FEEL again—and new-car operating economy, too!

Sealed Power Piston Rings are the best rings made, the choice of leading engine builders for 37 years. Sealed Power Ring Sets include the famous MD-50 Steel Oil Ring—the only ring with the Full-Flow Spring. See your dealer!

Send a postal for illustrated, informative new booklet on 7 ways to save oil. It's free and may save you real money. Sealed Power Corporation, Dept. H5, Muskegon, Michigan. In Canada: Stratford, Ontario.

© Sealed Power Corp. 1948

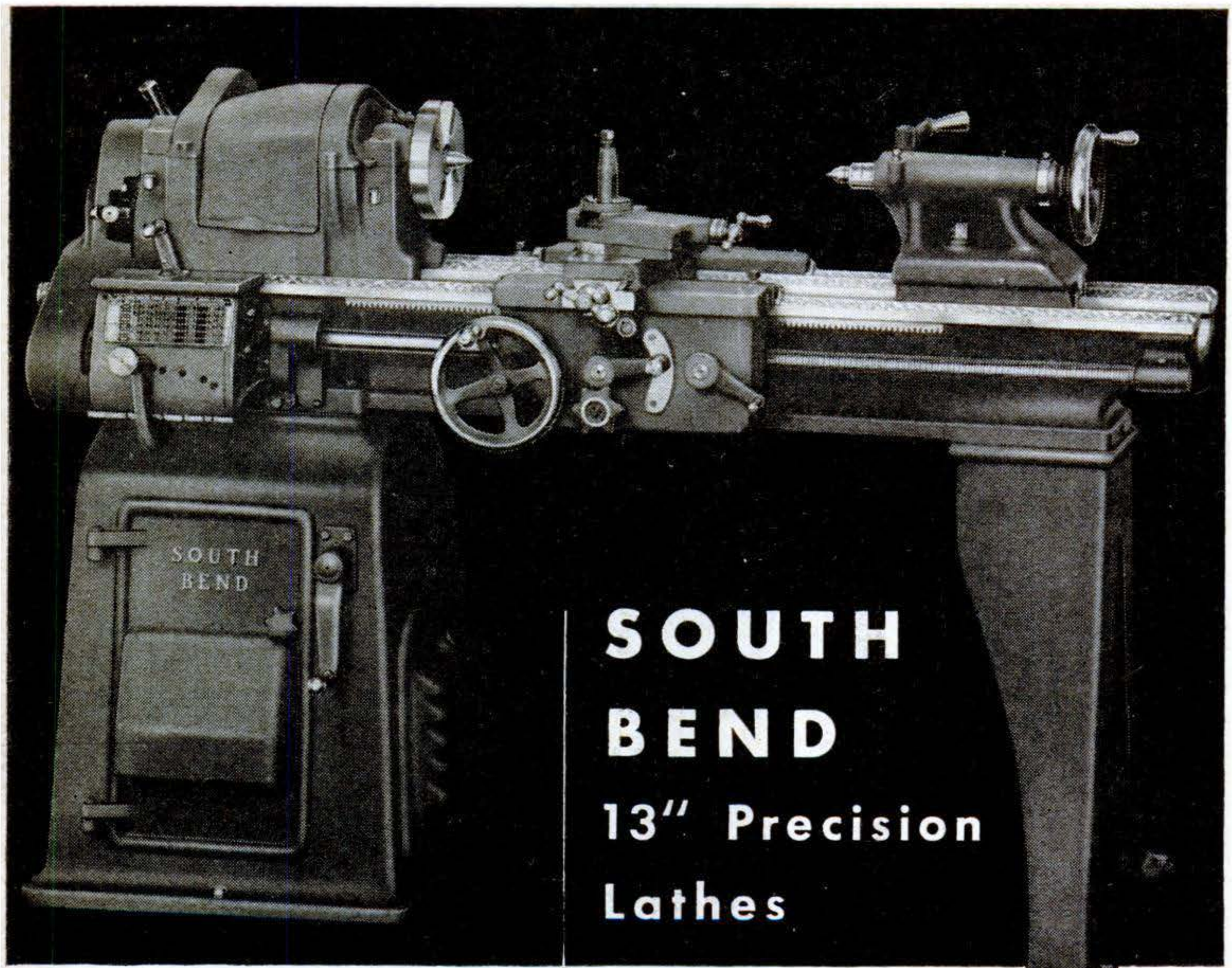
Your Sealed Power Franchised Dealer also handles Sealed Power Pistons, Cylinder Sleeves, Valves, Water Pumps and Chassis Parts.

Sealed Power

PISTON RINGS

BEST IN OLD CARS! BEST IN NEW CARS!

Copyrighted material



SOUTH BEND

13" Precision Lathes

Catalog No. 113-B 13" x 5' Quick Change Gear Lathe with 3 ph., 60 cycle, 220 v., A.C. motor and drum switch; f.o.b. factory $1153.50

South Bend 13" Precision Lathes offer many advantages where close-tolerance machining is required. They are economical of power, accurate, fast, and versatile; and have capacity to handle chuck work up to 13" in diameter, and between-center jobs up to 8" x 52". Substantial savings in capital investment, floor space, and labor cost often result from their installation.

The Quick Change Gear model (illustrated above) is popular for production operations, maintenance, and service work. The Toolroom model has **sufficient capacity to handle a large variety of toolroom work—its accuracy insures perfect results. Numerous tools and attachments are available for special jobs.**

Other South Bend Lathes with 9" to 16" swings—$145.00 and up. We also manufacture Precision Turret Lathes with ½" and 1" collet capacities, and a 14" Drill Press in bench and floor models.

Immediate delivery. Time payment plan available. Write for catalog.

SPECIFICATIONS

SWINGS: 13⅛" over bed and saddle wings; 8¾" over saddle with chip guard removed.

BED LENGTHS	4, 5, 6, and 7 feet
DISTANCE BETWEEN CENTERS	16 to 52 inches
COLLET CAPACITY	11/16 inch
SPINDLE BORE	1 inch
SPINDLE SPEEDS: Eight	34 to 875 r.p.m.
POWER LONGITUDINAL FEEDS: 48 R.H. or L.H.,	.0015" to .0841"
POWER CROSS FEEDS: 48	.0006" to .0312"
THREAD CUTTING: 48 R.H. or L.H. pitches	4 to 224 per inch
CROSS SLIDE TRAVEL	8⅛"
COMPOUND REST TOP ANGULAR FEED	3⅛"
TAILSTOCK SPINDLE TRAVEL	4¼"
TAILSTOCK TOP SET-OVER	15/16"

PRICE RANGE OF SOUTH BEND 13" PRECISION LATHES

Quick Change Gear Lathes	**$1054 to $1162**
Toolroom Lathes	**$1418 to $1494**

(Prices f.o.b. factory, less electrical equipment)

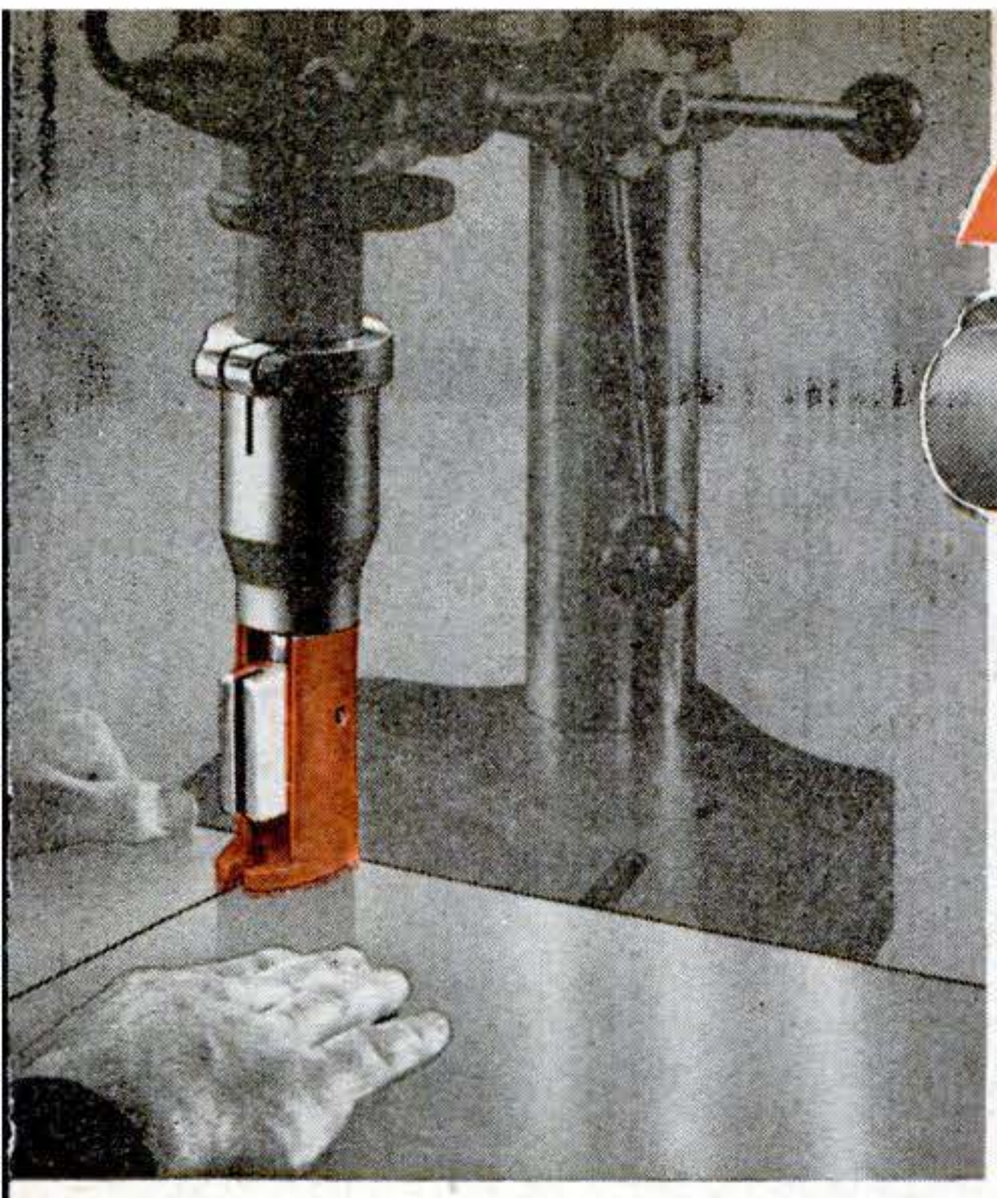
REG. U.S. PAT. OFF. & OTHER COUNTRIES

SOUTH BEND LATHE WORKS

Building Better Tools Since 1906 • 456 E. MADISON ST., SOUTH BEND 22, IND.

Copyrighted material

YOUR *Drill Press* IS



Your *Electric F*
other uses when us

ROTOJIG

Made by the manufacturer of the famous 1-2-3 Line

In a few seconds, the ROTOJIG at-ches to your Drill Press, changing the otary motion to a reciprocating ¾" troke action. This converts your drill ress to a power machine ideal for all awing, cutting, or filing operations in ood or metal. The ROTOJIG gives e same performance as a band or jig-aw, and also converts your drill press to a power filing machine for making es. Easy to follow scribe lines, cuts adii to ¼" inch, leaves both hands free guide material.

The ROTOJIG is made of the finest aterials; brass, bronze, and tool steel. he ROTOJIG is a cam-operated tool ith only two moving parts assuring nooth performance and long life. Full 60 degree swing. Models available for raftsman, Walker-Turner, Delta, Buf-lo, Royal and Atlas drill presses. Net t. 2¾ lbs., overall length 7¾". Oper-es at low speeds (300-750 RPM Spin-e Speed). Complete instructions with ch ROTOJIG showing its many uses.

2 ROTOSNIP

For ¼" drills, 1600-2500 r.p.m. Makes out of your drill. Will cut 20 gauge st Easily adjusted and sharpened. Mad tool steel. All parts replaceable. Extr $4.50. Weight 2¼ lbs.

Lifetime **guarantee**

Wherever a hand drill

Each tool of the 1-2-3 line has only two designed for jobs in hard-to-get-to pla pay for themselves after a few hours o

SEE YOUR LOC

Lifetime **guarantee**
Wherever a DRILL PRESS is used, this tool is needed

SAVE
$8.00

With this
Introductory Offer

For a limited time only, the ROTOJIG is being off a discount as an introductory offer. Since the ROTO made by the manufacturer of the famous 1-2-3 Li pendability and satisfaction is guaranteed.

-JAX
1 DESIGNING
2 ENGINEERING
3 MANUFACTURING

P. O. BOX 3044 DALLAS, TEXAS

$27.50 Value for only $19.5

Copyrighted material

WORLD'S ROUGHEST RIDE!

Copyrighted material